

THE HOOSAC TUNNEL :

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THE Maelstrom.

OUR FINANCIAL MAELSTROM.

By F. W. BIRD.

"Beyond the lowest depth, a lower deep."

B O S T O N :

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THE HOOSAC TUNNEL.

Before discussing the management and condition of the Hoosac Tunnel, and the policy and duty of the State, we present a brief historical sketch of the legislation relating to the enterprise. We shall see how it commenced as an ordinary and harmless railroad corporation, asking only, in the language of the petitioners to the legislature of 1848 in aid of the enterprise, "for the privilege of building their own *road* with their own *money*;" next, it asked a loan of the State credit for two millions of dollars, accompanying the petition with the most positive and confident assurances that, with that assistance, the friends of the work could and would furnish abundant means to complete it; and asking only that the scrip should be delivered in instalments, as the work progressed, so that the last instalment should not be delivered till the work was finished; next, asking a modification of those conditions more favorable to the projectors; next, asking of the State, with other favors, as advance or gratuity or both, some four hundred thousand dollars; at every successive step more and more confident that with the help asked at that time, the work could be completed; and *proving this* every time to the satisfaction of packed committees, and deceived legislatures, until at length the scheme was saddled upon the State treasury, with less than one one-tenth of the actual work done at a cost already nearly equal to *the original estimates for the entire work*. Let these facts be borne in mind that we may know what confidence can be placed in the statements of *the same parties* as to the condition, or in their estimates as to the cost of the completion of the work.

The Troy and Greenfield Railroad Company was chartered in 1848. The petitioners asked for an ordinary charter, simply for the privilege, to use their own language, of "building their

own road with their own money." The majority of the committee reported adversely; but the minority reported favorably, placing the claims solely on the ground of the necessity for additional railroad accommodations for the western part of Franklin County, and the northern part of Berkshire County, and that the people of that section of the State were entitled to the same facilities for building a railroad as had been granted to other sections of the State. The estimated cost was \$3,500,000, and the petitioners proved (!) that the entire road from Troy to Greenfield (exclusive of the tunnel,) would be built in eighteen months, and the tunnel itself, without any shafts, in fifteen hundred and fifty-six days, just five years. Three years after, in 1851, the corporation applied to the legislature for a loan of the State credit for two millions of dollars. Instead of having road and tunnel completed, they stated at that time, that "three hundred thousand dollars have been *subscribed* to the capital stock, and about *three* thousand dollars paid in. The work of construction has been commenced in the present month, but little has been done—nothing completed." The committee reported a Bill which passed the Senate but was defeated in the House.

In 1853, the application for a loan was renewed; a majority of the committee reported favorably. The Bill passed the House, but was defeated in the Senate. The amount of stock paid in at this time was \$88,831.

In 1854 the application was renewed, and was successful. The Bill was based upon the representation of the petitioners that the whole cost was to be between three and a half and four millions; the State was to furnish the two millions to build the tunnel, estimated by their engineer to cost about two millions, and the corporation was to furnish the balance necessary to finish the road, the whole to be mortgaged to the State as security for its advances, and "the different portions of the road and sections of the tunnel to be advanced together." At this time the amount of capital stock paid in was ninety-four thousand dollars. Soon after the passage of this Act, desperate appeals were made for subscriptions to the capital stock, the result of which appears in their annual report, made in 1856, giving the amount of capital stock paid in as \$121,412, showing

an addition of \$27,412 to the amount of stock paid in during two years.

In 1855 an Act was passed authorizing certain towns on the line to subscribe three per cent. on their valuation respectively to the capital stock. If all the towns had subscribed the full amount, it would have given \$259,283. The amount actually paid in was \$125,000.

In 1856 they asked the legislature to subscribe for \$150,000 of the stock. The proposition was rejected in the House by a vote of 83 to 192.

In 1857, an Act modifying the provisions of the Loan Act passed both branches, but was vetoed by Governor Gardner, passed in the House over the veto, but failed of a two-thirds vote in the Senate. This year the parties abandoned the idea of a local road, and for the first time raised the cry of a great commercial road, which was to pour the wealth of the West into Massachusetts and Boston.

In 1859 another modification of the Loan Act making still further concessions to the corporation was passed, but during this year very little was done.

Up to this time the legislature had adhered firmly to the policy of the original Loan Act, which was, that the advances by the State should be made *pari passu* with the progress of the work, requiring *bona fide* subscriptions to the amount of \$600,000, with other conditions furnishing something like security that the work should be completed before the whole amount of the loan was advanced.

The Act of 1860 took a long step downwards. It released the corporation from the \$600,000 subscription, (up to this time they had actually raised in cash, according to Mr. Kimball's report,—House Doc. No. 185, 1860,—\$66,058.28!) and made other concessions to the corporation; but the legislature still adhered to conditions which, if they had been honestly interpreted, would have secured deliveries of the scrip *in proportion to the work done*, and the delivery of the last scrip only when the work was completed. Unfortunately for the State, the governor at that time, and the State engineers appointed by him, adopted the constructions put upon the Act by the contractor, (Herman Haupt,) the result of which would have been that the whole amount of State scrip would have been

delivered before the road and tunnel were half *completed*. In May, 1861, William S. Whitwell was appointed State engineer, and adopted the only fair and honest construction of the Act. The result was, that in the summer of 1861, the contractor abandoned the work.

The action of the executive council of that year shows, strikingly and sadly, how completely, for the previous three years, the tunnel had dominated the legislative and executive departments of the State. (See Appendix A.)

LEGISLATION OF 1862.

We come now to the most extraordinary of the acts in this wretched drama. Mr. Haupt could not go on under Mr. Whitwell's construction of the Act of 1860, and the corporation nominally, Mr. Haupt really, came to the legislature of 1862, asking additional favors. As usual, a committee was packed in his favor, and reported all he asked. Among other things, they recommended the payment of \$150,000 to the corporation, (Haupt was the corporation,) in reality, to pay Haupt's debts, on account of alleged injustice done to him in the construction put by Mr. Whitwell upon the Act of 1860. The bill was defeated. Then occurred the most remarkable trick of legislative legerdemain ever performed, I think—at least, in this State.

The farce of a hearing had been played before the committee on this subject. A few gentlemen appeared before the committee for the purpose of aiding in investigating the condition and character of the enterprise. It was very soon found that the conclusions of the committee were already foregone. With perhaps a single exception, the committee was completely controlled by the tunnel interest, or rather by Mr. Haupt. Indeed, so perfectly did he dominate the committee that, at first, the chairman habitually refused to allow us to open any matter without his consent. The result was what we expected—a unanimous report, giving Mr. Haupt all he demanded. Precluded from any expression of facts through a minority report, we were forced to make our appeal to the legislature through other channels.

The report of the committee proceeded upon the assumption that Mr. Haupt had been wronged by Governor Andrew and

the State engineer, and their whole purpose was to give him redress. Accordingly, they recommended the payment, (nominally to the corporation, really to Haupt,) of \$150,000 and an advance of \$195,000, for work to be done, and, also, the payment to him of all sums he should expend for machinery, &c., (including pneumatic drills, &c., &c.!) The bill was reported on the 24th of March. Various substitutes, amendments, &c., were proposed. Among these was one offered by Mr. Swan, of Norfolk, proposing the appointment of commissioners to investigate the whole matter of the tunnel, and report *to the next legislature*. Another section required the attorney-general to take possession of the railroad under the mortgages to the State. Another authorized the governor and council to finish the railroad from Greenfield to the mountain. The latter provision was considered of no practical importance as, first, it was not considered possible that the governor and council could do so foolish a thing as authorize the building of a railroad into a *cul-de-sac*, with no prospect of its being wanted for a through line for ten years; and second, the rails were all bought and paid for, the road was said to be very nearly finished, and such glowing accounts had been given of the local business, that it was supposed that the traffic would partially, perhaps wholly, pay the interest on the trifling additional cost of completing the road. How we were humbugged in this matter, as well as in all others, the sequel will show.

After a protracted fight, in which all the log-rolling tactics, so long successful, were brought into action, and after full discussion, on the 21st of April, Mr. Swan's substitute was adopted by a vote of 18 to 17. This result was regarded by the plunderers as a Waterloo defeat,—for all was lost, even honor.

The next morning, an act of inexplicable stupidity, or timidity, robbed us of all the fruits of the hard-won victory. Mr. Plunkett, of Pittsfield, moved to recommit the bill to a special committee of the Senate! We had the winning cards in our hands. Several senators, who had voted against Mr. Swan's bill under pledges the day before, would thenceforth, it was well known, support this bill. But—under what influences I know not—perhaps when the secrets of the club-room at the

United States hotel are revealed, we shall know—the fatal motion was made. We protested—but it was too late.

No, it was not entirely too late. By long-settled parliamentary rule, the bill was entitled to have a majority of its friends on the committee. Through an excess of courtesy, which aimed to represent all parties on the committee, the President of the Senate placed on the committee two friends of the bill—Messrs. Plunkett, (his motion made him at least a doubtful friend,) and Swan; two opponents, Messrs. Crocker and Richardson; and, for the fifth, Mr. Williams, of Worcester. This gentleman had introduced a substitute, which was ostensibly opposed by the tunnelites proper, as strenuously as Mr. Swan's bill, and he was supposed to occupy a position of neutrality. We had not learned then, what we afterwards discovered to our sorrow, that there was no more unconditional tunnel man in the Senate than he.*

In the afternoon of the same day, the committee reported a new bill, substantially as it finally passed. The two tunnel men, Messrs. Crocker and Richardson, refused to join in the report! It was afterwards found that they had got more than they had dreamed of asking. The most important change in the bill as originally reported was, that no portion of the road should be constructed "without the approval of the governor and council." This restriction was in Mr. Swan's bill, but was not in Mr. Williams' substitute, nor in the bill reported by the special committee, but was afterwards inserted. This amendment prevented the supreme folly of building the road on the contractor's wretched location, as Mr. Brooks would have done without this restriction, and thus saved the State a million or so of dollars, and the discredit of building a road entirely unfitted for a great traffic, and which would ultimately have been abandoned.

The Bill passed to be engrossed in the Senate on the 23d,

* We did not then know of the existence of a disturbing element in the shape of that phantom railroad corporation, the Worcester, Barre, and Gardner Railroad, the design of which is to tap the Vermont and Massachusetts Railroad at Gardner, and bring all the tunnel traffic through Worcester to the Boston and Worcester railroad. Atrocious as is the bad faith of this scheme towards Fitchburg and the Fitchburg Railroad, it answered its purpose; and, without alienating the allies it was designed to cheat, it brought to the aid of the tunnel a *reserve* which alone turned the tide of battle against us.

(*nem. dis.*), was taken up in the House on the 24th, and after a very brief discussion, and the adoption of amendments, was passed and sent back to the Senate. On the 25th the House amendments were concurred in, the tunnel men voting solid against them, including all the leaders, Messrs. Crocker, Griswold, Richardson, Smith, Stevens, and Williams.

Up to this time, the substantial victory was with us. 1st. We had taken steps to rescue the enterprise from the utterly bankrupt and powerless corporation which had ceased to exist. 2d. We had defeated the attempt to swindle the State out of three or four hundred thousand dollars, and had ousted Mr. Haupt from all connection with the enterprise. 3d. We had secured the appointment of commissioners *by Governor Andrew*, (the Act required that they should be "able, *impartial*, and skilful,") to make a thorough investigation of the whole matter; and though the Act did not require that they should report "to the next legislature," we knew full well that such a commission could not report before another legislature should meet. 4th. Although the Act nominally seemed to contemplate the prosecution of the work on the road and tunnel by the State, yet it made such prosecution subject, in both cases, "to the approval of the governor and council;" and as it was well known that for the last eleven months Governor Andrew had been the object of the bitterest and most unsparing hostility from the tunnelites proper, and as the universal impression entertained by his most intimate friends, was that he was opposed to the tunnel, the argument addressed to the opponents of the tunnel "Are you afraid to trust this matter with Governor Andrew?" was unanswerable. 5th. Although the Act contained provisions for the payment of certain claims which it was well known, were intended to cover Mr. Haupt's debts, yet it expressly limited the payment to "*just claims*;" and as we did not for a moment dream that this would be interpreted to mean anything but "*just claims*" against the State, and as this too was under the control of the governor and council, it was considered an entirely harmless provision. Under these considerations, though the Act was not all we aimed at, we accepted it, *as did the tunnel men*, as a substantial defeat of the scheme. Had it been supposed at the time that the result would be, the adoption and prosecution of the tunnel as a State work, not one-

third of either House would have dared to go before their constituents on a vote in its favor.

The key to the whole problem was now in the hands of the governor and council. The Act required the commissioners to "report to the governor and council what, in their judgment, will be the most economical, practical, and advantageous method of completing said road and tunnel, the estimated cost of fitting the same for use, the time within which the tunnel can be completed, and what contracts can be effected, and with what parties, for completing said tunnel and road, and *the probable cost of the same, the probable pecuniary value of the road and tunnel when completed, the sources and amount of traffic and income*, and all other facts, &c., &c." We felt perfectly confident that if we could secure a report faithfully fulfilling those requirements, especially the clauses which we have italicized, no sane man could ever recommend the prosecution of the work by the State. We thought we should get such a report. We shall see.

More than all their accustomed audacity, persistency, and adroitness was thenceforth devoted by the tunnelites to procuring the right kind of commission. Of the influences which led to the selection of the gentlemen who composed the commission, we do not propose to speak, except to express our undoubting confidence that Governor Andrew intended to secure, and thought he had secured the services of "three able, impartial and skilful commissioners."

CHANGE OF FRONT.

Let us pause for a moment to consider the extraordinary character of this transaction. The whole purpose of the hearing before the committee had been to show that Mr. Haupt had been aggrieved, and the whole object of the committee's bill was to remunerate him for losses sustained by the action of the executive. Defeated in this, and reinforced at the critical moment by unexpected allies, the whole line changed front, deserted their leader, General Haupt, sneaked into the enemy's camp and laid down their arms; and, after the smoke cleared away, it was found that they had seized our guns and turned them upon us, taken possession of our treasure-chest, and added to their audacity the impudence of asserting that all this was

stipulated in the terms of their surrender! The annals of legislative history will be searched in vain for a parallel.

We were outwitted. There is always a sort of credit attached to success, however won; but nothing can justify or extenuate the treachery which attended this transaction. Mr. Haupt was basely and shamelessly, even exultingly and remorselessly betrayed. Whatever may have been our opinions of his conduct, they, upon their own showing, were bound by every consideration of interest, of gratitude and of honor, to stand by him to the bitter end. He had shouldered the enterprise, and for three years had been corporation, board of directors, engineer, contractor—everything. They had uniformly avowed that, with the bare payment of the sums justly due to him, he could and would complete the work. But the very moment the prospect opened of saving themselves by sacrificing him, they turned their backs upon him as shamelessly as ever a gang of burglars abandoned a stool-pigeon who could no longer serve them. The old adage—honor among thieves—was forgotten. Well might Mr. Haupt exclaim in the language of Woolsey (slightly altered,)

“ Had I but served *the State* with half the zeal
I served my friends, *she* would not, in my *need*,
Have left me naked to mine enemies.”

We had hoped that when the rogues fell out, honest men would get their dues. The sequel proved that we were mistaken.

THE COMMISSIONERS.

We have now reached a new stage. The commissioners appointed under the Act were John W. Brooks, Samuel M. Felton, and Alexander Holmes. Mr. Brooks was unknown outside of a very narrow circle in Boston. He had been brought into notice by a master, a much abler man than himself, John M. Forbes, Esq., to whom he had made himself eminently serviceable in certain extensive railroad operations at the West. Arrogant, insolent, and domineering towards those whom he considered his inferiors, or over whom circumstances gave him the advantage; plausible, deferential and obsequious towards those whom he could not browbeat or cajole; incapable, from

early training and pursuits, of liberal and comprehensive policies; made by his master, president and director in several important railroads at the West, but in no respect identified with Massachusetts interests, he entered upon this work, (even crediting him with good intentions up to his capacities,) under the natural bias of Western interests, with the aim of benefiting those interests, by opening another avenue for his Western traffic to Boston. Had he been generally and well known in Massachusetts, I venture the assertion that he could never have been placed at the head of a commission requiring the highest qualities of "able, impartial, and skilful men." In his case the old proverb, "like master, like man," failed. His character is well described in the saying of a courtier of Louis XIV.:—

*Il eut cent vertus de valet,
Et pas une de maitre.*

We needed a master; we got a lackey. And yet, as we shall see, he assumed the airs of a master, well illustrating a striking remark made by the elder Dana in a lecture many years ago,—“What more unsparing tyrant than a despot? Always, always that despot's slave!”

Mr. Felton was at that time president of the Philadelphia, Wilmington & Baltimore Railroad; a gentleman of experience, ability, and character. But, residing at such a distance, it was impossible that he should give that attention to this work which, especially with such a chairman, its importance demanded. Indeed, his labors, increased many fold by the exigencies of the war, broke down his health, so that he was obliged to resign both the presidency of that road, and his place on this commission. Mr. Felton, too, was a tunnel man from the start. For many years before he went to Baltimore, he was superintendent of the Fitchburg Railroad, and of course, as was well known at the time of his appointment, all his sympathies and prepossessions were with the tunnel. Mr. Holmes had been long and favorably known as a railroad manager of large experience, of great capacity, independence and integrity; but he too was so engrossed with the large and extending enterprises entrusted to his direction that he has been able to give but the slightest personal supervision to this work.

It thus appears that two of the commissioners were so fully committed, by interests and sympathies, to the Tunnel, that but one conclusion could be expected. It also appears that an unfortunate combination of circumstances in the relations of two of the commissioners to other enterprises, which properly had the first demands upon them, practically left the whole control of the commission with Mr Brooks. We have given more space to these details than would seem to be necessary; but without them, the partisan character of Mr. Brooks' first report, and the discreditable mismanagement of the work, would be utterly inexplicable.

MR. BROOKS' FIRST REPORT.

We shall not attempt a minute exposure of the shallowness and the inconsequential conclusions of this "big pamphlet." It would require a volume. We content ourselves, for the present, with this general statement, which a careful examination of this report and of their subsequent reports, together with the developments of nearly three years of work will fully warrant, that the cost of the work will immeasurably exceed their estimates, the time of completion will be extended many years, and the estimates of traffic, which are mainly based upon trumpery tables of Western business and of the traffic on other roads without the slightest proof that the opening of the tunnel will considerably increase the amount of this traffic to Boston, are utterly fallacious and delusive. We shall refer to some of these topics again. For the present, we copy some extracts from the very able articles of "Civil Engineer" in the Boston "Daily Advertiser." These articles are the more valuable as coming from a gentleman recently from another state, without interest or prejudice in the premises, but who wrote solely as an engineer and an unbiassed expert. Referring to the commissioners' report and to those of the engineers accompanying it, he says:—

I must repeat that I have looked in vain through these reports for the reasons that prompted the State of Massachusetts to embark in this stupendous folly, for I find only reasons why it should not be undertaken. Their engineer tells us, p. 210, that "New York city possesses advantages for exporting breadstuffs that *no railroad can neutralize.*" That not only are her facilities for transportation by canal and river such that "no

railroad can compete with them," but "her railroad connections with the West are also shorter," the difference being "from 50 to 75 miles in favor of New York;" and that, though Boston is 200 miles nearer Liverpool, New York has the greater advantage for obtaining return freights. He thinks that the failure, for the twelve years that the project was before the public, to raise the necessary means for its construction is "evidence of the *want of commercial value* in the project," p. 212, and yet he considers "the question of its commercial value" and the "benefits to the State the ruling or main consideration which should determine the advisability of its construction," p. 213. This is good reasoning, and the conclusion is logically inevitable that as the main consideration is wanting, its construction is not advisable. If it is not a good financial investment, and has no commercial value, why persist longer in such an extravagant, wastful and wanton delusion? But look further, and on page 122 we find Mr. Storow's opinion very faintly disguised in the concluding sentences of his report. After alluding to the uncertain and unsatisfactory nature of all estimates of this kind, and to the many contingencies which experience has shown go to swell the cost, he says, "If the advantages to be derived from the tunnel are not an equivalent for an expenditure of \$3,000,000 thereon, exclusive of interest, it is not worth while to pursue the undertaking;" and then, with great tact, he adds, "Whether the very great advantages anticipated from the opening of this new avenue to the great West, with diminished distance and diminished grades," (!) &c., "are sufficient to warrant the construction of this work, at such an expenditure of time and money, is a matter which it is not for me to discuss, but remains for the considerations of the commissioners."

Look again, and on p. 138, what does Mr. Latrobe say? "It is manifest that if, even in the somewhat distant future, may be discerned a prospect of public benefit, &c." Is it possible for words to express more delicately the doubts which, in spite of himself, shook his faith in the policy and expediency of the project? But he adds, "*if* the enterprise *really* possesses the merits claimed for it, (which I cannot doubt,) half a million, more or less, should not stay its progress."

So far we have found little encouragement and no arguments in favor of the adopted policy. But we shall certainly find in the report of the commissioners, reasons so cogent and conclusive as to override all these doubts, and force conviction upon every mind. For in so important an undertaking as this there should be most satisfactory and conclusive evidence adduced of its vital necessity, and of the great superiority of this new route, before involving the State in such an enormous expenditure.

We begin the search, and find first, that they commend Mr. Storrow's "interesting and instructive report to the most careful and attentive perusal." We peruse it, and learn all about European tunnels, but he declines to give any opinion about the Hoosac Tunnel. They tell us that "Mr. Latrobe's authority is quite as good as that of any other engineer, and that his report will repay a careful reading." We read it carefully, and learn from him how a tunnel ought to be built, but see no reasons advanced for building the Hoosac Tunnel. They tell us that Mr. Laurie's "valuable discussion of the subject will be found in his General Report." As Mr. Storrow had said, "it is not for me to discuss it," we suppose it was left for Mr. Laurie. And so we wade through Mr. Laurie's 87 closely printed octavo pages, and find that the scheme has labored through 12 long years without finding anybody to appreciate it,—that it will cost a great deal of money,—that the route has such and such grades, and a great deal of unsafe curvature,—that if built it will divide the business with the Western Railroad, to which as a passenger road it is inferior,—that Boston cannot compete with New York city in the exportation of breadstuffs,—that he sees evidences of the want of commercial value in the project,—but that he has "neither data, time nor ability to go fully into these subjects,"—and so ends his valuable discussion of the subject.

Well, we return to the report of the commissioners, which from the beginning has read as though written on the assumption, the foregone conclusion, that the tunnel shall be built at all hazards, and we read all their speculations about how the tunnel should be worked, with what faces and headings, how long it will take to build it, "that great waste is the *inevitable* result of works constructed by States," that this route will help build up Manchester and Portsmouth, N. H., and Portland, away down in Maine, that the Boston and Albany is the best freight line between Boston and the West, and that the tunnel route is about as good! but that there is "a margin in favor of New York" over either; that, aware the thing would not pay as an investment, they have made a contract with the Fitchburg and other roads to help the State out by throwing in one-fifth of their hard earnings, (as though it did not come out of the people after all;) that the town of North Adams would "furnish the line *considerable* business;" and, finally, that, "considering the large sum which the Commonwealth has already invested in this work, *which would be lost* if it is not completed," &c., "the work should be undertaken and completed by the Commonwealth." Oh! most lame and impotent conclusion!

This is a brief but fair and honest synopsis of the whole subject, as set forth in that great report of February, 1863, when the legislature, after a show of thorough investigation, deliberately determined to put

this thing through, and the governor deliberately sanctioned it. (I hope I may not be charged with disrespect in calling it a "thing." It is not a tunnel, nor is it likely to be, nor a road, nor a line. It has been called an enterprise, a project, an undertaking, a scheme, a work, a new avenue, a feature, a route, for, like certain other rough subjects, it has many *aliases*, and perhaps one is as good as another.) It is true an attempt is made to prove that there is business enough to justify its prosecution, by showing that the total amount received for freight between Boston and Albany during the last twenty years was \$7,636,206, (an amount but little more than half the receipts on the Pennsylvania Railroad alone the last year,) but that this business will probably be largely increased, and that "*it would seem as if* the increased facilities offered by the tunnel line," which we have failed to discover, "should put it in the power of the Boston merchants to build up a large and profitable trade from this source." (Page 88.) First build the tunnel, and then build up the trade! Truly the present generation of Boston merchants have a glorious prospect in store for their successors. A legacy of debt and taxation, and the privilege of building up a trade by means of a line connecting them with the West in every respect inferior to the one already constructed.

It will not by pretended that the Western road is worked up to its full capacity, in the face of the statement on page 99 that the through tonnage on the New York Central Railroad for the year 1862 amounted to 770,190 tons, while upon the Western road, for the five years preceding, it amounted only to 672,737 tons, an average of 134,547 tons a year, or about one-sixth of that upon the New York Central. It is difficult to believe that intelligent men can be sincere in a proposition to expend so many millions of dollars to construct another line to divide this comparatively trifling business with the Western road.

No one questions the possibility of tunnelling the Hoosac Mountain. Mr. Storow says, page 117: "As regards the feasibility of completing such a work, I entertain no doubt whatever." Mr. Latrobe says, page 126, "that any work, of whatever magnitude, must be pronounced practicable, if the means for its accomplishment are within the reach of human power." Mr. Laurie says, p. 213, "the tunnel is perfectly practicable;" and the joint special committee of the legislature in their report of Feb. 1865, p. 37, say "that do doubt remains in the minds of any as to the entire feasibility of the scheme." And because it is practicable, forsooth, it is therefore expedient! No matter what it cost, no matter whether it will be of any economical or commercial value when finished, because everybody says it is possible to do it, it must be done. Plenty of time and plenty of money, and surely the great State of Massachu-

setts has both, is all that is necessary. We must not investigate too closely the expediency, nor question the policy recommended by the commissioners, of the Commonwealth's undertaking and carrying on to completion this Quixotic scheme. The legislative committee quoted above, say, p. 37, "It is not within their province to *discuss the merits* of the tunnel enterprise," and so say all the engineers. Everybody seems afraid to discuss its merits but one man.

And here I may be allowed to say that I not the slightest acquaintance with that gentleman, even by sight, and the same remarks will apply to the commissioners. If I have any prejudice or bias, it is that which every engineer must feel professionally, a desire to see so great and scientifically interesting a work carried successfully through. But I cannot, on the grounds of political or domestic economy, nor as a financial operation, nor as a valuable commercial enterprise, see any reason for its further prosecution. I admit that the State of Massachusetts and the city of Boston should not shrink from any enterprise that will materially shorten the distance or increase the facilities of transportation to the great West, but I deny most emphatically that it has been shown that the Boston and Troy route by the Hoosac Tunnel does accomplish these results, and insist that a wise and sensible policy dictates the immediate abandonment of this, the greatest folly of the age. If we would participate more fully in the great and increasing trade of the West, we must look in some other direction, or find out some other route which will unquestionably secure to us the facilities and advantages which the tunnel route utterly fails to afford.

We remark, in passing, that the language of this report, the acts of the commissioners, and the phraseology of the Act of 1863, all agree in refuting the claim set up by the tunnelites that the Act of 1862 was intended to authorize or, fairly interpreted, did authorize the resumption of work on the tunnel by the State. The commissioners say, "We are of opinion that the work should be undertaken by the State." They would hardly recommend that to be done which the State had already determined to do. Until action by the legislature of 1863, they had not struck a blow or spent a dollar on the work, but referred the matter to the legislature. The governor, in his message transmitting their report to the legislature, endorsed this reference. The legislature in the first section of the Act, chap. 214, of 1863, declared, "The commissioners are *hereby* authorized, subject to the advice and approval of the

governor and council, to construct, &c., &c.” It was alone the recommendation of the commissioners that the work should be undertaken by the State, that revived the dead enterprise and led the legislature to authorize the resumption of the work.

In the order of history, we come to the system adopted in the disbursement of the money of the State. Early in the year 1863 it was thought desirable by the executive department, to establish a plan for accountability and economy in the disbursements and expenditures of the large amounts which would be required. Bills were coming in, and larger were expected. Accordingly a plan was embodied in the following Order:—

COMMONWEALTH OF MASSACHUSETTS.

EXECUTIVE DEPARTMENT, COUNCIL CHAMBER, }
BOSTON, February 2, 1863. }

Questions having arisen as to the practical administration of that part of the existing statute concerning the Troy and Greenfield Railroad, appropriating money, in reference to the proper method of auditing accounts and claims payable thereunder, it is therefore,

Ordered, By the Governor, with the advice and consent of the Council. That all bills for expenses incurred, for service rendered, or for awards and allowances made, by direction of the Commissioners on the Troy and Greenfield Railroad, under authority of chap. 156 of the Acts of 1862, shall be accompanied by satisfactory vouchers, and shall be required to specify dates and amount of expense, time of service and rate of compensation, and all other details necessary to a full and proper understanding and adjustment of the claims which they represent. And it is further ordered, that all bills and claims accruing under authority of said Act, shall be first examined and approved by not less than two of the Commissioners aforesaid, except, when this is inconvenient or impracticable, the approval of the chairman of the Commissioners shall suffice for accounts not exceeding fifty dollars respectively, and that said Commissioners shall certify in their approval that the charges and allowances are just and reasonable.

The accounts when thus rendered to the Governor, and by him submitted to the Council Committee of Accounts for examination, shall, if found correct by them, be returned to the Governor, who will transmit the same to the Auditor of Accounts, and if found by him to be in conformity with the statutes of the Commonwealth and with this Order, he will certify the same for allowance. The Secretary of the Commonwealth will send to the Auditor of Accounts a copy of this Order for his

guidance, and a copy also to the chairman of the Commissioners on the Troy and Greenfield Railroad.

Order adopted February 3, 1863.

OLIVER WARNER, *Secretary*

SECRETARY'S DEPARTMENT, BOSTON, Feb. 4, 1863.

A true Copy.

Attest :

OLIVER WARNER,

Secretary of the Commonwealth.

In July Mr. Brooks presented to the governor a requisition for twenty-five thousand dollars. An Order was laid before the council in the following terms:—"Ordered, that \$25,000 be paid to the commissioners, &c., to enable them to carry out the provisions of chap. 214, sect. 2, 1863." Mr. Brooks submitted no bills, no statement of the purposes for which the money was needed; but autocratically demanded it, and threatened to resign unless it was voted unconditionally. It was argued that the Act of 1863 made it the duty of the council to vote whatever money was "required" by the commissioners. To this it was replied that the phraseology of the Act of 1863 was precisely the same, upon this point, as that of 1862. In both cases the language was, (sect. 7 of 1862, and sect. 2 of 1863,) "The governor is hereby authorized to draw his warrant on the treasurer of the Commonwealth for such sums as may be required, &c., &c.;" and if the council were justified by the Act of 1862 in passing the Order of Feb. 3, 1863, they would, unless they rescinded that Order, have stultified themselves in voting this sum after the legislature of 1863 had used the same language under which that Order was passed. Besides, the Act of 1863 went further than that of 1862 in placing with the council the control of this matter, by providing that the commissioners, when required, "shall present to the governor and council an account of all contracts entered into by them as such commissioners, and of all payments and charges by them made, with their vouchers therefor, which vouchers and accounts shall be examined, and if found correct and in good faith, *shall be allowed by the governor* and council; but no lease of any part of said railroad, nor any contract amounting to more than ten thousand dollars shall be made by said commissioners without the consent of the governor and council." Thus carefully did

the legislature guard the treasury from the drafts of Mr. Brooks, and thus clearly was the duty of the council defined. The council, after a long and sharp discussion, rejected the Order, advancing the \$25,000 to Mr. Brooks, one councillor only and the lieutenant-governor, voting in the affirmative. Mr. Brooks did not resign!

The whole matter was then referred to a committee who submitted the following report:—

“The undersigned, to whom was referred the communication of the Commissioners of the Troy and Greenfield Railroad and Hoosac Tunnel of July 20th, 1863, have conferred with J. W. Brooks, Esq., Chairman of said Commissioners:—The Committee find that Mr. Brooks has already used several thousand dollars for drills, &c., and will be obliged to use [several thousand more for other purposes, the details of which cannot now be given; but Mr. Brooks promises that a full detailed report shall be given to the governor and council in thirty days from this date, and every thirty days thereafter.

“Your Committee would therefore recommend that an Order be passed placing to the credit of said Commissioners, the sum of fifteen thousand dollars, agreeably to 2d section of the 214th chap. of the Acts of the current year.”

An Order in accordance with the recommendation of this report was adopted, and Mr. Brooks pocketed the money and the affront. After this resistance by the council to his insolence, Mr. Brooks mended his manners.

Immediately after the passage of the Act of 1863, it was found that Mr. Brooks was determined to proceed immediately to the construction of the road from Greenfield to the tunnel, *on the location made by Mr. Haupt*. Members of the council thought that if the road were to be built by the State, it should be of a character worthy of the State. Without a dissenting voice all the members of the council accepted the Act of the legislature of 1863, as conclusive of its purpose to complete the work; but a majority of the council insisted that the location should be revised with the view of adopting a route with engineering characteristics fitting it for a great commercial road. To secure this, the following Order was passed:—

COMMONWEALTH OF MASSACHUSETTS.

COUNCIL CHAMBER, BOSTON, June 2d, 1863.

Ordered, That the Commissioners cause Mr. Laurie forthwith to survey the route between the east end of the tunnel, and Bardwell's Ferry, with a view to ascertaining what changes of location ought to be made, and in directing the route thus obtained and giving the data for a reliable comparison of the cost and of the engineering characteristics of of the present line, and the line thus obtained, as parts of a great commercial road. The report to be made before the first day of July next.

It was apparent that the time was too short to make proper surveys; but, determined to show no factious opposition, all the members acquiesced. Without consulting Mr. Brooks—for the obvious reason that the Act of 1863, sect. 1, placed this matter of alterations in the line of the road entirely under the control of the governor and council—Mr. Laurie was immediately telegraphed to by the governor, and directed to commence the surveys forthwith.

Mr. Laurie reported at once to Mr. Brooks. "I am here, Mr. Brooks, to make the surveys ordered." "What order? what surveys?" replied the autocrat. "The surveys ordered by the governor and council." "I have ordered no surveys and want none. When I need your services, I will send for you. Go about your business!" and he went, and thus closed his service under Mr. Brooks. The result was, that the Order of the council was defied; no surveys were made, but the work on the road was, for the time, abandoned. It was probably Mr. Brooks' impunity in repudiating the authority of the governor and council that emboldened him in his attempt, in July following, to seize the key of the State treasury, uncontrolled by the governor and council.

Mr. Laurie's sturdy Scotch integrity disqualified him for Mr. Brooks' purposes. When Mr. Laurie presented to Mr. Brooks his report published with the first report of the commissioners, it contained statements and conclusions unsatisfactory to Mr. Brooks, and the railway king, who was determined that the reports should justify his foregone conclusions, demanded the suppression of some portions of the report and the modification of others. Mr. Laurie, with a professional reputation of the

highest character at stake, after making such concessions as he could honestly make, resolutely refused to yield to Mr. Brooks' imperious demands upon material points. Then "never more be officer of mine." But his report, when carefully read, is a practical condemnation of the whole project. We have no time to examine it in detail; nor is this hardly necessary, after the extracts we have given from "Civil Engineer's" article. If one will read the concluding pages of Mr. Laurie's report, commencing with the "Comparison with other routes," he will have no doubt as to Mr. Laurie's real judgment. Undoubtedly, had the report contained a full expression of his views, it would have been impossible to torture from it any other conclusions than those which, it is well known, he entertains.

The head and front of Mr. Laurie's offending are found in the following passages from his report on the "Deerfield Route," (pp. 170 *et seq.*) "It (the Deerfield route) has 489 degrees less curvature, 150 feet less rise and fall, and reduces the maximum grade on the T. & G. Railroad ascending west, from 58.6 to 50.16 feet per mile. The length of the through route is reduced by this line $\frac{92}{100}$ of a mile." He then shows that the Deerfield route would cost \$97,975 more than the Greenfield—a sum which, taking into account the saving of distance by the Deerfield route, and its superior engineering characteristics, is entirely insignificant in locating a great commercial road. We quote again: "The Deerfield route is much superior to the present road as a through line; but *it will not accommodate Greenfield* nor the local business of the Deerfield Valley with that town so well." Considering that Greenfield has already two railroads passing through the village, connecting with Boston and New York on the east and south, and with Vermont and Montreal on the north, it would hardly seem that her claims should offset all the advantages of the Deerfield route for a through road. "The nearest suitable depot is two-thirds of a mile further from the village than the present junction." He concludes: "Viewed as a through line, the saving of nearly a mile in distance, 489 degrees of curvature, the reduction of the maximum grade, and the avoidance of the Green River bridge, with its sharp curve, would be of considerable importance."

And yet Mr. Brooks persists in his determination, though checked by the action of the governor and council, to build the road on the Greenfield route. In addition to the increased distance and the heavier grades, every ton of the immense traffic which he fancies is coming over his road would be obliged to describe one entire circle and a third of another more by the Greenfield than by the Deerfield route in passing over eight miles of road. Still Mr. Brooks persists; and only last summer he ordered new surveys with a view to resuming work on the road. And whom did he employ as engineer? A man of unbiassed judgment, of recognized integrity (I mean professional,) of large engineering experience and capacity? No, but Alfred R. Field, of Greenfield! I say nothing of Mr. Field's personal character; but I affirm that any fair-minded man who will make himself familiar with Mr. Field's conduct in connection with this enterprise, especially if he will read pages 25, 26 and 27 of Mr. Kimball's report (House Document 185, 1860,) and pages 81 and 82 of the appendix, can come to no other conclusion than that Mr. Field was the very last man in the State to have been appointed engineer. But he was just the man for Mr. Brooks, and he was set to work. Luckily for the State, Mr. Felton resigned last summer, and James M. Shute was appointed as his successor. Mr. Shute is well known as a "tunnel man;" but he is a gentleman of the most cautious and exact business habits, of independence and integrity. He, as well as Mr. Holmes, saw the folly of building the road; and they voted Mr. Brooks down, and stopped the waste of money on that wretched location.

We have brought the history of the tunnel down to 1863. We are compelled to be brief, and have therefore exhibited but a very small portion of the trickery and rascality of the management. Following as closely as may be the order of time, let us look next at the item of the amount of the people's money applied by Mr. Brooks to

THE PAYMENT OF MR. HAUPT'S DEBTS.

I have not the data for giving the exact aggregate. It lies somewhere between two hundred and three hundred thousand dollars! It will be remembered that the Act of 1862 authorized the commissioners to "audit and allow all *just claims* for labor,

service, land damages &c., &c., and may procure the release of all attachments and discharge all liens on said materials." Now, the only justification for the payment, by the commissioners, of any claims was, first, that the legislature had expressly specified the payment of certain claims; or secondly that there were valid liens on any of said materials which it was the interest of the State to discharge; or thirdly, that the claims were "just;" that is, of course, "just claims" *against the State*.

It cannot be argued for a moment that the legislature specified any of these claims as entitled to be paid. The Senate, after full discussion, had rejected the bill which appropriated \$150,000 upon the very ground that the money was intended to pay Mr. Haupt's debts for "labor, services, materials and land damages" *for every dollar of which the State had already paid Mr. Haupt*. If they had intended such payment they would have said so; and the provision would have killed this bill as it did the committee's bill. They did not say so; and therefore the only inference is, that they intended that the commissioners should pay only "*just claims*" against the State.

Nor, secondly, can it be maintained that any considerable portion of the materials were subject to valid liens. With regard to the whole of them, with a single inconsiderable exception, these pretended liens could not have stood an hour's investigation. We cannot examine them all. Take one: the claim of the Rensselaer Iron Company. Mr. Haupt received from the treasury State scrip as follows: on July 10th, 1861, \$38,000; on July 11th, \$55,000; and on the 12th, \$500. These sums included payment for iron sold to him by the Rensselaer Iron Company, and the scrip was advanced to Mr. Haupt upon his certificate that the iron had been delivered by him to the Commonwealth. Mr. Haupt paid a part of the proceeds of this scrip to the agent of the company, and *on the same day*, July 11th, this same agent attached the iron for a balance due the Rensselaer Iron Company! And yet this claim was allowed by the commissioners, and, I am sorry to add, approved by the council in 1863.

Could such a claim be said, in any respect, to be a "just claim" against the State? Observe, that for these materials, as

well as for nearly, if not quite all the other claims allowed, and paid by the commissioners, the State had once paid Mr. Haupt in full. It might be a pardonable act of generosity for the State to pay the claims for land-damages, though the parties all had ample security against Mr. Haupt, under the laws, and voluntarily relinquished it; but the second payment of these large amounts to sub-contractors and to this company in another State, which made the sale to Mr. Haupt with their eyes open, was an absolutely inexcusable and wanton squandering of the State's money. It was not the business of the State to collect the bills of the Iron Company. If they would dance in such company, they must expect to pay the piper. We surely ought not to have paid for heating the poker.

There never was a more atrocious swindle than the payment of these claims, especially those of the sub-contractors and the Iron Company. Of course, I do not put the whole responsibility upon the commissioners. The majority of the council must divide it with them. The only possible ground upon which they could be affirmed to be just claims against the State, was, that Mr. Haupt had been wronged to that extent by the action of Governor Andrew and the State engineer in 1861, and therefore the State ought to give him this money to enable him to pay his debts. But neither the commissioners nor the majority of the council will plead that defence.

Another item of reckless expenditure by Mr. Brooks, is that for

POWER-DRILLS.

From the day Mr. Brooks entered upon this work up to this hour, he has cherished the delusion that he could successfully operate power-drills in the Hoosac rock, and this against the judgment of engineers and in the face of the uniform failure of every trial he has made. At first, he was so perfectly confident that the machines used at Mount Cenis would work, that he actually remitted the money abroad for the purchase of those machines. For reasons which it would have been more creditable to have learned before he sent the money, he did not take them. Next he tried other machines, equally confident of success. Thus, in his report made in 1864, he says, "Drilling machines

will not be likely to be in operation at this place (the east end,) before next midsummer." Of the central shaft, he says, "We hope *by the latter part of winter* to get some automatic drills at work in the shaft, &c., &c." Of the west shaft, "Machine-drills are not likely to be used here before next spring, and *perhaps not till early summer.*" All have failed. Now he tells us that drills are being constructed at Fitchburg which are to work beautifully. "Confidence is a plant of slow growth." I would hardly set limits to the achievements of mechanical skill in perfecting drills for this purpose; but the failures of the past destroy all confidence in his predictions. And yet, he has the hardihood to say in his last report, "If machine labor comes up to the estimate *as well as hand labor has done*, the completion of the whole work may be brought about *somewhat* within the time estimated." Why did he not say, "If these machines work as well as those whose success I have as confidently predicted, but which have all failed, &c., &c." We *knew* what hand labor would do; we don't know what machines will do; and therefore the comparison is defective and deceptive.

Mr. Brooks has taken care not to give us, in separate items, the cost of his fruitless experiments with machine drills. In Mr. Doane's last report, the aggregate of the items of cost of machinery is \$108,661. What portion of this amount was for drills we have no means of knowing. This omission seems remarkable in a report, which descends to such details as to give the cost of drill-holes to the thousandth part of an inch, and of candles to the thousandth part of a pound! We only know that the cost of other machinery, in addition to what was on hand when he commenced the work, has been small, and it is fair to infer that a considerable portion of the above aggregate has gone for power-drills. Whatever it has been, it has all been wasted.

Another of Mr. Brooks' pet schemes is

THE DEERFIELD DAM.

Last year I published some statements relating to this folly, and I reaffirm every one of them. First, as to the power. It will be remembered that the engineer, in his report for 1864, said,—

“After a thorough discussion of the comparative merits and cost of steam and water-power, taking into account the fact that the required power *must be a continuous one, working through the twenty-four hours of every day*, it was determined to build a dam in the Deerfield River which would furnish a power equal to about eight hundred horses.”

Eight hundred horse-power, where the power is required for continuous working through twenty-four hours in a day, means power to that amount for the whole of every day in the year. Mr. Brooks says, in the same report :—

“It is designed to use the water upon turbine wheels, one of which, of about one hundred horse-power, is already upon the ground. This will be put in operation upon air compressors, and its size and fitness tested before others are procured.”

This means that there must be a continuous power of over one hundred horses. I stated that I learned on the ground from *one who knew*, that the last time the water was measured, it gave about fifty horse-power ; and that, in my judgment, when we were there in September, the amount was much less than that. No authentic contradictions to these statements have been made. Mr. Doane, in his report this year, gives measurements of the flow of water over the crest of the dam in August, October, November, and December ; but no measurements are given for September, and of course the measurements given do not affect my statements as to the quantity of water in that month. But he does give a statement of the amount of rain falling in August as $2\frac{42}{100}$ inches, and in September as $\frac{56}{100}$ of an inch, the amount in September being a trifle less than $\frac{4}{17}$ of that in August. Now his measurements for the last ten days in August give $\frac{227}{1000}$ of a foot as the average flow of water over the dam, for each of those days. Reducing this in the same proportion as the amount of rain in September fell short of that in August, and we have $\frac{053}{1000}$ of a foot as the daily average flow of water in September. Mr. Doane furnishes us with a table giving the horse-power to each tenth of a foot of water over the crest. One-tenth of a foot gives 42.5 theoretical horse-power ; which, two-thirds being “ effective ” power, (and that is more than he will ever get out of Mr. Brooks’ turbine wheels,) gives 28.3, as the effective horse-power to each

tenth of a foot of flow. The average flow in September we have found to have been $\frac{0.53}{1000}$ of a foot. This is equivalent to a theoretical power of 22.5 horses, or an effective power of fifteen horses; that is, in September they had a continuous power of fifteen horses! If this is not hoisting the engineer with his own petard, I don't know when the sport was enjoyed. I gave it as my opinion last year that the water, when I was there, would not give "ten horse-power for twenty-four hours in the day;" and Mr. Doane's own figures show that I set the amount above the actual measurements.*

What Mr. Doane means when he says, "it was measured during the season several times, and the least quantity found gave a theoretical power of one hundred and sixteen horses," I cannot imagine; when his own measurements give two days of less than fifty theoretical horse-power, and several of less than a hundred. We are left to guess why no measurements are given for September.

It has been alleged that the past season has been one of unprecedented dryness for these months; but Mr. Doane makes the statement that last year the amount of rain in those four months was $7\frac{9.1}{100}$ inches, and in 1829, it was $8\frac{18}{100}$ inches, and in 1846, $9\frac{42}{100}$ inches. The difference—being in one year $\frac{27}{100}$ of an inch, and in the other, $1\frac{51}{100}$ inches—if averaged over four months of each year, would hardly give Mr. Brooks a continuous power of eight hundred horses!

But, it seems from the last report, that Mr. Brooks is not sure of even this insignificant power. Mr. Doane says:—

"The canal is finished, and water was let in on the 24th of November; but on account of the porous nature of the natural banks, it has been

* Strictly speaking, the actual power in September was much less than the above calculation gives. It will be seen from Mr. Doane's tables, that as the flow of water decreases, the power diminishes relatively, much more rapidly; thus, five-tenths of a foot of flow of water gives 917 theoretical horse-power; four-tenths gives 629; three-tenths, 380; two-tenths, 176; one-tenth, 42 theoretical horse-power; at this rate of diminution, $\frac{0.32}{1000}$ of a foot of flow of water would give theoretically two horse-power; effectively, nothing. As a matter of fact, any amount of power less than a hundred horse continuous power, is equivalent, for use at the Tunnel, to no power at all; for any power much less than a hundred horses, will not start a turbine wheel of a hundred horse-power; of course, any less power will not drive it up to speed to do the work of a hundred horses.

filled gradually, and has as yet only been raised seven feet, or to a level one foot below the crest of the dam.

"The banks leak very considerably, but no giving away is looked for. By putting in sawdust, and stirring the silt of the canal, they will no doubt by-and-by become tight."

Any experienced owner of water-power will doubt the last prediction. I never before heard of stopping a leak in a dam or canal, with sawdust, except as a temporary expedient; and if the natural banks are of so porous a nature as to "leak considerably," Mr. Brooks will find that he can only get a tight canal by building bottom and sides of stone laid in cement. Here goes I know not how many thousand dollars more. Meantime this "considerable leak" will still further reduce his power.

It is upon such a stream as this that Mr. Brooks has built his magnificent structure.

COST OF THE DEERFIELD DAM.

Last year I estimated the cost of the water-power at \$200,000. We have now Mr. Brooks' figures of cost *up to the date of the report*. The final cost remains to be known, as it seems that they are still at work on the buildings and the wheel-pits, "a fourth being just begun." The leaks in the canal, too, are yet to be stopped. But we will take the figures as they are given.

The items of the cost of the dam, including waste-gates, canal and wheel-pits, are separately given; so also is the machinery at the dam. The cost of "engineering and superintendence" for the whole work is put in gross at \$59,999.90. The cost of all the buildings at the east end is put at \$27,851.65. It will not be unfair to charge one-third of the engineering and superintendence, and one-third of the buildings at the east end, to the dam. We have then the following items of the cost of the dam and appurtenances, as given on page 52 of the report:—

Deerfield dam,	\$125,919 74
Excavation and masonry at east end of dam,	12,535 86
Wheel-pits,	45,878 09
Gates and overflow,	9,419 73
Race or canal,	21,353 03

One-third engineering and superintendence,	\$19,999 97
One-third buildings east end,	9,283 88
Machinery at Deerfield dam,	10,297 92
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Total cost of dam, buildings and machinery,	\$254,688 22

Probably a part of these buildings might be used for steam-power whenever they introduce it, as they must before their operations require a continuous power of fifty horses. Strike off the odd thousands, and we have the round sum of \$250,000 as the cost of the water-power and appurtenances up to last December!

It seems absolutely incredible that any man in his senses could have committed this folly. I think too highly of even Mr. Brooks' business capacity to believe that he could have done it with his own money. But it is a State work, and there is plenty of money, and Mr. Brooks would immortalize himself by building a dam compared with which Holyoke and Lawrence should be but boys' play. Accordingly he spends an hour or two of a pleasant spring day, when the stream was full, in an exploration; listens to the statements of the "oldest inhabitant," as to the permanence of the power, orders surveys to be made, and, sitting comfortably in his office in Merchants' Exchange, adopts his plan and gives his orders—*sic volo*, *sic jubeo*, and the State pays over a quarter of a million of dollars, nearly every dollar of which has been thrown away. For remember, they *must* introduce steam-power; and the fixed investment for this power must be just as great, and of course the interest on this investment the same as if there had not been a dollar spent for water-power. It follows that the only return the State will get for this enormous cost of water-power will be the saving of the fuel which would be used for steam-power during those portions of the year when water-power shall be used.

Let us figure the cost of this power. I avoid the domain of poetry. I do not criticize Mr. Doane's graphic sketch on page 23 of his report. I can well understand how natural it is that he should seek to forget ugly facts, and enjoy the artistic beauty of Mr. Brooks' cascades. But we must deal with prosaic figures and facts. The dam will have cost when finished, at least \$275,000. I repeat what I said last year, that as a water-

power for use, after Mr. Brooks has done with it, no business man would pay for it and use it there, \$10,000. He might get that worth of material out of it to carry away; but it would not be worth that to use there. Ten thousand dollars will buy a larger continuous water-power than that, within twenty miles of Boston. The loss, when it comes to a sale, will be \$265,000. Mr. Brooks says he shall finish the tunnel in seven years. This gives an annual depreciation of \$37,855. The interest on the cost will be \$16,500. But they must have steam-power too, and use it, at least for six months of the year; for Mr. Doane's measurements will show that they have had less power this winter than they had last summer. The power then averaged, for August, seventy horse effective power; for September, calculated from his statement, fifteen; for October, from his measurement, 105. These figures show that they must have auxiliary power for three or four months in summer and fall, and nearly as long in winter. We make the calculations for two hundred horse-power. Two steam-engines of a hundred horse-power each, with boilers and all appurtenances, will cost at the outside \$20,000 each. The fuel to run them six months will cost \$9,000. Depreciation, ten per cent. of cost. We have then the following as the annual cost of water-power with steam as auxiliary:—

Interest on cost of dam and fixtures,	\$16,500 00
Depreciation, $\frac{1}{7}$ of \$265,000,	37,855 00
Interest on cost of steam-power,	2,400 00
Fuel for six months,	9,000 00
Depreciation,	4,000 00
<hr/>	
Annual cost of mixed power,	\$69,755 00
Cost for seven years,	\$488,285 00

If Mr. Brooks had used steam-power instead of water, the annual cost would have been—

Interest on cost of engines,	\$2,400 00
Fuel,	18,000 00
Depreciation,	4,000 00
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Annual cost of steam-power,	\$24,400 00

Cost for seven years,	\$170,800 00
Excess of cost of mixed power,	317,485 00

So much for Mr. Brooks' theorizing. True, this sum is a mere trifle in the grand total of millions which the whole work involves; but such as it is, a man of common sense would have saved every dollar.

Mr. Brooks can look sharply after other people. He saw very clearly the mote in Mr. Haupt's eye, in the shape of forty or fifty cents in the value at which the pound sterling was computed below the legal rate, amounting, on the whole amount of sterling scrip issued to Mr. Haupt, to some forty thousand dollars. In equity, the claim of the State against Mr. Brooks for this sum of \$289,485, ultimately lost by building the Deerfield dam, stands on a better foundation than the claim on which judgment has been rendered against Mr. Haupt. But Mr. Haupt's friends had deserted him, and Mr. Brooks' haven't—*yet*.

We come now to a piece of folly in comparison with which the transactions thus far examined have been the perfection of wisdom.

THE WEST APPROACH, OR THE DEMORALIZED ROCK.

The work here was suspended last September, and nothing has since been done. Mr. Doane treads very gingerly over this ground. His account of last year's operations is so excellent a specimen of how not to tell the whole truth, and yet not tell a lie, that I copy it entire.

"In December, 1864, the heading was begun, and in a few weeks reached a distance of one hundred and eleven feet, part of the distance having been driven and timbered up at the rate of six feet per day. It was very dry nearly all the way, and did not trouble the workmen by caving, except when entering the face of the rock, and before the timber support could reach the roof.

"One Monday morning, it was found that the perpendicular forward face of the heading had caved in, some time during Sunday, and that a great deal of water was being discharged. *The caving continued till it reached the surface, forty feet overhead, so the heading was stopped.*" (Well it might be—forty feet of porridge!)

"The thorough cut was afterwards extended by its different levels further east, and in June and July, 1865, some cribs were sunk down at the forward end of the heading, advancing it about twenty-eight feet. It was discovered that a large stream, coming up through a hole some ten feet deep, was what stopped the heading in December. This is now passed, but there is more or less water in front still, which makes it somewhat difficult to get underground again by the ordinary methods, though, I think, not impracticable.

"But about the time these cribs had been sunk to grade, came the west shaft developments, which, in connection with the facts learned by sinking the wells, indicated the necessity of a change of plan. It was found that there was little hope of reaching solid rock. Though a heading could be driven through this material easier than the full-size tunnel, it would have a tendency, if the enlargement did not at once follow, to injure the texture and firmness of the rock, to enlarge the water-filled fissures cut by the passage of the heading, and make the enlargement of the tunnel more difficult.

"It seemed evident enough that simple heading had better be abandoned; that the tunnel should be commenced full size and permanently lined either with brick or iron, as fast as the work advanced. As it would require some time to choose between the methods of proceeding, and as the season was so far advanced as to render it impossible to make or get bricks in sufficient quantities, I thought it wise to stop further work at once, and to send the men to the east end, where they could profitably be employed in completing before winter what work was there to be done."

He then tries to convince himself that if he can get along until he passes a brook overhead, he shall find better material; and this in face of the fact that he has got to pass under a valley which is the receptacle of all the water of the western slope of the mountain; that the time at which he was driven off by the water was, according to his own statements, the driest month ever known there; that all his test wells towards the west shaft, up to the date of the report, reveal the same demoralized rock, with large quantities of water; and that in the west heading of the west shaft he encountered the same material, as related in the following paragraph:—

"In the last week of July, there was noticed a marked change in the character of the rock. It began to look rusty in color, or sappy, as if approaching the outside of the ledge. The drill-bits cutting before only

three and three-fourths inches each, now cut ten inches each. Some pieces of rock fell from the roof, which was a very unusual thing, and large seams, filled with a decomposed rock, very much like that at the west end began to appear. These seams also discharged very much water. Fearing that further progress might reach ground that would break in from above, and flood both headings, and it being especially important that the east heading, having so far to penetrate, should not be hindered, a discontinuance of the work in the west heading was ordered on the 2d of August."

And yet he thinks it "not impracticable to get underground." The difficulty is not so much in getting underground, as in keeping on after he gets there. Nobody supposes it is impracticable, with time and money; but the questions are,—

WHAT WILL IT COST?

and will it be worth the cost?

The distance from the west shaft to the west face is 2,300 feet,—all demoralized rock. The only *data* we can gather from Mr. Brooks' reports upon which to estimate the cost of tunnelling this 2,300 feet, are found in the cost of the work thus far done at the west approach. The whole amount expended by Mr. Brooks at the west approach has been \$134,794. How much advance has been made with this sum it is difficult to ascertain. On page twenty-four of the report for 1864, (House Document No. 3, 1865,) he says, "we have made an open cut at this point," (that is, the point where Mr. Haupt left off,) * * * "until we are arrived at the point where tunnelling is begun. The first timbering was set up about twenty days ago, and some progress has been made in penetrating towards the west shaft." How far the open cut was carried, or what progress was made in tunnelling in twenty days, we have no means of knowing. Both, in that bad material, could have amounted to but a few feet. In his report this year Mr. Doane says, that "in December, 1864, the heading was begun, and in a few weeks reached a distance of 111 feet," when, one Sunday, in utter contempt of the fourth commandment, it caved in. "The thorough cut was afterwards extended," (how far, we don't know,) and in June and July cribs were sunk, "advancing the heading about twenty-eight feet." This, too, has now caved; and cribs, walls,

timbers and all are submerged in porridge. From the best information I can get, the actual progress from the point where Mr. Haupt stopped is about 125 feet. But they have spent here \$134,794. A small portion of this has probably been spent in repairing Mr. Haupt's heading. Allowing \$9,794 for that, (and, from appearances, this is a liberal allowance,) and the cost of this progress has been \$125,000, or a thousand dollars a lineal foot. At this rate, the 2,300 feet remaining will cost \$2,300,000!

But all experience thus far at this point proves that the remainder of the work will be much more difficult and expensive than the commencement. The west heading of the west shaft was stopped because they dared not go further for fear of an inundation of porridge. The west face was abandoned because of such inundation. Now let it be borne in mind that the work was stopped by this irruption of water, in September, the month in which the smallest amount of rain fell of which we have any record. At Lowell, $\frac{5.6}{100}$ of an inch; at Amherst, in the tunnel region, $\frac{3.8}{100}$. The amount of rain in each of three other months—the driest months of the year—was five times that in September. I have before me records kept at several points in Massachusetts of the amount of rain for each month, for several years; and one of these gives the fall of rain at Springfield, as follows:—

	1860.	1861.	1862.	1863.	1864.	1865.
June, . . .	4.12	3.31	10.04	1.70	0.56	3.74
July, . . .	5.32	3.94	6.54	9.77	1.22	3.86
August, . . .	4.98	5.35	3.25	3.35	2.54	1.67
September, . . .	4.93	3.36	1.83	2.44	2.61	.65
October, . . .	2.60	5.19	2.76	4.23	2.07	4.57
Aggregate for 5 m'ths,	21.95	21.15	24.42	21.49	9.00	14.49

It thus appears that the aggregate fall of rain in each of the four years next preceding 1864, when they first struck the demoralized rock, was from 133 to 170 per cent. greater than

it was in 1864, and from 50 to 70 per cent. greater than it was in 1865 ; that in the months of August and September of the first four of these years, it was from two to four times greater than in the same months of 1864 and 1865 ; and that in one month it was sixteen times greater, and in others it was twelve or fifteen times greater than in the month of September, when they abandoned this work.

If the difficulties of penetrating this material were found insurmountable last September, what will they be with five, ten, sixteen times more water in the soil ?

With any appliances now at their command, they admit it to be useless to attempt further progress. The practical conclusion to which engineers have arrived, is that progress can only be made by the use of shields similar to those used in the Thames tunnel. Mr. Doane tries to think that a part of the work may be done "without the use of a shield ;" but he discusses the matter with the evident conviction that he will have to use them. He says :

"Mr. Wm. C. Pickersgill, now of East Boston, an engineer who has had experience in English tunnels, advises to put in a shield at once, and has given me a plan of one. I do not think it exactly adapted to our case."

Now, the only tunnel ever built through material at all similar to this demoralized rock, is that under the Thames. Generally the material in the Thames tunnel was much less difficult of management than this porridge, as a large proportion was a tenacious clay, nearly impervious to water. This tunnel was commenced in March, 1825, and completed in August, 1842. Deducting seven years, during which the work was suspended for want of means, the work occupied nearly eleven years. The length is 1,300 feet. The cost was £614,000, or, in round numbers, \$3,070,000. This, remember, was at gold prices for materials, with labor at "starvation prices"—sixty cents a day, instead of two dollars, which is about the average price at the Hoosac tunnel. The cost of the Thames tunnel was \$2,361 per lineal foot (!) in gold. At the same rate, the cost of tunnelling the 2,300 feet of demoralized rock would be \$5,430,300 in gold ! at prices prevailing here, at least double

that amount. It is not strange that even Mr. Brooks hesitates to attack it.

I see no reasons for inferring that this tunnel will cost less, foot for foot, than did the Thames, unless Mr. Brooks' friends claim that he is a better engineer than Mr. Brunel. The excavation for the Thames tunnel was $22\frac{1}{2}$ feet high and 38 feet wide; after the masonry of the top and walls was built, the clear area was about 15 feet high and 28 to 30 feet wide. If walls of the same thickness as those in the Thames tunnel will sustain this demoralized rock, the excavation here will be a trifle less than there. But of that nobody can be sure. The probability is that the masonry here must be thicker than was necessary there, and that the original excavation must be even larger than that.

Again, the irruptions of the river must have increased the cost of the Thames tunnel. I cannot find, however, that these casualties added largely to the cost. At the first irruption, only 25,000 cubic feet of earth were thrown into the tunnel; of course, the cost of removing this and pumping out the water was an inconsiderable item. This occasioned a delay of but a few weeks. The next irruption—the largest—occasioned a delay of about three months. From the best information I can get, the others were unimportant. The suspension of the work for seven years, and the embarrassment for want of means, also added somewhat to the cost. But all combined make but a small amount in proportion to the whole cost,—*much less than the interest, which is not included* in the £614,000 given as the cost.

I repeat, then, we have no *data* for computing the cost of this work, by comparison with similar works, so reliable as the cost of the Thames tunnel, and these bring the cost of this up to \$5,430,300 in gold! These figures seem fabulous; they certainly are frightful. If Mr. Brooks can give any *facts* to show their fallacy, let him produce them; but neither prophecy nor rhetoric will do. And I undertake to say that responsible contractors cannot be found who will guarantee to complete this work for that sum.

With these facts before us, I hesitate to venture an estimate, as a reliable one, of the

COST OF COMPLETING THE TUNNEL.

Mr. Brooks says :

“The original estimates contained in the Commissioners’ Report, made in February, 1863, were based upon the cost of ordinary labor at one dollar per day, and of materials at a corresponding rate. Since the resumption of the work, so great has been the advance in every item of expense incident to the prosecution of such an enterprise, that these estimates must necessarily in that respect be modified. The Commissioners feel confident that *with such modification*, the work may be completed without any essential variation from the statements of cost heretofore made.”

Ah, doubling the price of labor and materials is a very “essential variation.”

Mr. Brooks’ original estimates of cost were \$5,719,330. These estimates were based on the cost of ordinary labor at one dollar per day of *eleven hours*. Mr. Doane says in his last report—

“Since December 10, 1864, wages have been unchanged. Outside common laborers receive \$1.50 per day of ten hours. Miners in the enlargement of headings receive \$2 per day of ten hours. Miners in the east end and west shaft headings, as well as central shaft, receive \$2.25 per day of eight hours. So long as miners in the coal regions can make from \$5 to \$8 per day, it is useless to think of reducing wages upon the tunnel.”

The reduction of the hours of labor and the increase in price makes the wages about double the rate upon which the original estimates were based. Up to December 1, 1864, wages of common laborers ranged from \$1.25 to \$1.75 per day, and of miners, from \$1.50 to \$2.00. At no time have wages been as low as one dollar per day ; so that all the work done up to December 1864, cost from twenty-five to seventy-five per cent. more than the original estimates.

We have no means of knowing the amount of money expended in 1863, as *Mr. Brooks’ report for that year has never been published*, and after diligent search I have been unable to find it. But in the report for 1864, the whole amount expended on the work, since its assumption by the State up to December 1864, is given as \$415,483. Allowing one-half of this as expended in 1863

and we have \$207,741, as the amount expended up to December, 1863, at prices on the basis originally assumed by Mr. Brooks. We have then, (taken from first report, p. 57):—

Advances made,	\$968,862 00
Interest for eight years,	462,585 00
Expended in 1863,	207,741 00
Interest compounded, seven years at 5 per cent.,	88,000 00
	<hr/>
Amount expended to December, 1864, . . .	\$1,727,188 00

Deducting this sum from the amount of Mr. Brooks' original estimates, \$5,719,330, and we have \$3,992,142 as the cost of completing the work from December 1, 1864, on the original basis of cost of labor and materials. At double the original estimate for labor and materials, the cost would be \$7,984,282.

But Mr. Brooks reckons interest at five per cent. The rate for two years on our scrip, on account of the premium on gold, has varied from seven to twelve per cent. Hereafter we cannot expect to borrow a dollar for less than six per cent. This will add, at least, another hundred thousand dollars to the estimate.

How much shall be added for the additional time which will be necessary to complete it? Three years of the eight which Mr. Brooks allowed for completion, have already gone, and not one-tenth of the work is done. How many years? Three? five? ten? No sane man believes it will be completed in less than ten years from this time. This adds interest for five years; say, (I will not stop to compute it,) a million of dollars.

How much shall be added for the cost of tunnelling the demoralized rock? Two? three? six millions? The margin is very wide. Call it three millions. We then have the following as the cost of the whole work from its assumption by the State:—

Cost to December, 1864,	\$1,727,188 00
Mr. Brooks' estimate from that date, . . .	3,992,142 00
Extra interest,	100,000 00
Interest on above for additional five years, .	1,000,000 00
Demoralized rock,	3,000,000 00
Interest on last item, averaging five years, compounded at six per cent.,	1,012,600 00
	<hr/>
Total cost,	\$10,831,930 00

Now, I am well aware to how large an extent such estimates must be conjectural ; but I challenge exception to any of these items as extravagant. We do know this, that hitherto actual results have exhibited a cost very largely exceeding the estimates. I say further, that not an unbiassed and competent engineer can be found who will not give it as his judgment that the cost will far exceed these estimates rather than fall short at all ; and I know, still further, that no responsible contractors can be found who will guarantee to complete the work for this sum ; and that, after all, is the best practical test of the cost.

We come now to the great question—

WHAT IS TO BE DONE ?

The State has expended thus far,—

Advances to January, 1863, and interest, .	\$1,431,447 00
Expended in 1863 and 1864,	415,483 00
Expended in 1865,	477,142 00
<hr/>	
Total to December, 1865,	\$2,324,072 00

If we stop now, we sink all this, except what the machines would sell for.

The cost of machinery has been,—

In 1863 and 1864,	\$252,917 00
In 1865,	241,600 00
<hr/>	
	\$494,517 00

This might be sold, perhaps, as follows :

Deerfield Dam,	\$10,000 00
Machinery, say 20 per cent. on cost, \$484,517,	96,900 00
Iron on hand, say,	250,000 00
<hr/>	
Tunnel effects in liquidation,	\$356,900 00

Deducting this sum from total cost to December, 1865, and we have \$1,947,172 as the loss which the State must pocket, if we stop now.

Will it pay to go on? Let bygones be bygones; is it better to sink what we have spent, or to send new dollars enough after the old ones to finish the job? I have made the

Total estimate of cost,	\$10,831,930 00
Expended up to this time,	2,324,072 00
<hr/>	
Cost of completing, on this estimate,	\$8,507,858 00

We come then to the practical question: *Is the Tunnel worth completing at a cost of eight and a half millions of dollars?*

This question is to be viewed in two aspects: First, Will it pay in the additional facility it gives for business with the West, thus indirectly increasing the wealth of the State? Second, Will the traffic pay for the investment? These questions are so closely related that they will, to some extent, be considered together.

THE INDIRECT ADVANTAGES.

Will the additional facilities which the tunnel route will give to the business of the West with Massachusetts, justify its completion? At the start we throw out the through passenger traffic; for Mr. Brooks admits, in his first report, that "the Western road will take the greater part of the through Boston passengers," though he thinks the Tunnel route will divide the Saratoga pleasure-passengers with the Western Railroad. He says, "*If* no bridge should be built at Albany, and *if* no change of cars be required on the Tunnel route east of Schenectady, the physical advantages of the routes, so far as time is concerned, may be considered as nearly balanced." But the bridge at Albany is built, and though, of course, it will not be impracticable to arrange for running through from Schenectady to Boston without change of cars, no man knows better than Mr. Brooks that the practical difficulties of making such an arrangement are quite serious. Between Schenectady and Boston, by the Tunnel route, there are five different railroad corporations: the Schenectady and

Troy, the Troy and Boston, (both in New York,) the Troy and Greenfield, (or the tunnel, owned by the State,) the Vermont and Massachusetts, and the Fitchburg. Between Albany and Boston there are two, soon to be united in one. He admits that the advantage which the Western road has of a double track all the way, "will more than compensate for the difference in length, which must be computed from Schenectady, *where it is but five miles.*" He concedes another great advantage to the Western road. "The travel between Springfield and Boston is very large; this, added to the New York travel through that city, renders it profitable to run two, and sometimes three express passenger trains per day. By taking the western passengers on these trains, they are enabled, without any extra expense, to give them great dispatch over this half of their line." He is therefore forced to admit that "the Western road will command the greater part of the through Boston passengers." We dismiss, therefore, the passenger traffic from constituting an element of the exigency for another route to the West.

We come, then, to the

FREIGHT TRAFFIC.

After examining other routes, Mr. Brooks admits that "the Boston and Albany road is the best freight line between Boston and the West, and it is with this that the tunnel route should be compared."

THE COMPARATIVE LENGTH OF THE ROUTES.

It seems to have been taken for granted that there is a large saving in distance by the Tunnel route, over the Western. As a specimen of these disingenuous—I will not say dishonest—attempts to mystify the public on this point, look at a table of distances given by Hon. Alvah Crocker, in a speech in the Senate in 1862. True, he states that it is "a table of distances *from Troy*;" but the table is got up to show the advantage of the Tunnel route over the Western, and the design is to give the impression that it is a fair statement of the relative merits of the two routes in this respect. Otherwise, the table has no meaning. Thus he gives the distance "to Boston, *via* Western railroad, 208 miles;" " *via* Troy and Greenfield, 189 miles."

Most people would understand this to mean that Boston is nineteen miles nearer to the West by the Tunnel route than by the Western. The rest of his table is equally deceptive, or more so.

Now, the competing point is Schenectady. All the through traffic for both these routes comes to that point. Thence it is brought either by the New York Central road to Albany, for the Western road, or by the local roads there diverging to Troy, for the Tunnel route. The distances from Schenectady to Boston are,

From Boston to Schenectady, by Tunnel line,	. 212 miles.
From Boston to Schenectady, by Western line,	. 217 miles.

The difference in the length of the lines is thus conceded to be five miles. This is more than offset by the difference between the distance of the Western Railroad freight depot and the centre of business in Boston, and that of the Fitchburg freight depot and the same centre, with the inconvenience to the Fitchburg freight of the intervening drawbridge. Add to this the consideration that the growth of Boston *must* be east and south of the Western depot, bringing that still nearer the centre of business. Now, though a truckman, in making a contract to carry miscellaneous freight to and from all the railroads in Boston, might not make any difference when the Fitchburg freight forms a very inconsiderable portion of the whole, yet when we are talking about hundreds of thousands of tons, these considerations form quite a material element. For all practical purposes, then, the distances between Boston and Schenectady, by the two routes, may be considered equal.

ENGINEERING CHARACTERISTICS OF THE ROUTES.

The principal stock in trade of the tunnellites has been the alleged superiority of the Tunnel route over the Western, in the matter of grades. (They keep wisely silent about the curvature.) So noisy and so persistent has been the clamor, that the public has come almost to believe that the high grades on the Western road presented an insurmountable barrier to their transporting the Western freight which is seeking an avenue to Boston. Mr. Crocker says, in the speech before

referred to, "assuming grade and curvature to govern the maximum load of a train, it is believed that an ordinary freight engine of twenty-four tons will draw fifteen hundred barrels of flour on the Tunnel line with the same facility as eight hundred upon the Western!" It is by such preposterous statements, made by men whom the community are accustomed to believe in other matters, that the exigency for another railroad to the West has come to be regarded as proved. And yet it is just such men as Mr. Crocker that the tunnel interest sends to the general court to enlighten the legislative mind upon grave questions of public policy, and they talk to me of "tunnel on the brain." I do not impugn their general honesty or common sense; but any statements coming from such partisans are entitled to just as much credit as were the vagaries of honest old Gabriel Thompson upon the quadrature of the circle.

Mr. Brooks, in his first report, makes the best case he can in favor of the tunnel as a freight line, and his figures differ very widely from Mr. Crocker's. He says: "It has been found that the locomotive which would haul an average of $86\frac{87}{100}$ tons upon the Western Railroad route, would take 102 tons, or $17\frac{4}{10}$ per cent. more, upon the Tunnel route." On this basis, Mr. Crocker's engine, which would take 1,500 barrels of flour over the Tunnel route, would take 1,277 barrels, instead of 800, over the Western road. So widely do doctors disagree.

After the statement in the extract above quoted from Mr. Brooks' report, he goes on to say: "A net saving is therefore made of 28 per cent. of $17\frac{4}{10}$ per cent., or about 5 per cent. of the total cost of transportation, by reason of the easier controlling grades of the Tunnel route." He then says, "This, represented by miles, would reduce the distance from 189 to $179\frac{1}{2}$ miles, or say 180 miles," (he is very liberal in throwing in this half mile, especially when he had put the distance to Troy a mile and a half less than he had elsewhere stated it to be,) "and reduce the general cost of transportation between Boston and the Hudson River ten per cent." Now, it does not follow that, because the distance is ten per cent. less, the cost of freight will be ten per cent. less; for everybody knows that the longer the line, the less, relatively, as compared with a shorter line, will be the cost of carrying *through* freight. Again, in order to secure his ten per cent.

saving, he is obliged to assume that the New York Central Road will always deliver freight at Troy, four miles further, at the same rates as at Albany; and he argues that "even should a bridge be built across the river at Albany, it will probably be as cheap for that company to send a part of its business to Troy, as to incur the inconvenience of passing it through the crowded Albany terminus." And he supposes anybody will believe this, when, with the bridge built, there will be a continuous track from Buffalo to Boston, and Albany is no more the terminus for through freight than is Schenectady, or Utica, or any other point on the line. Besides, as I have shown, the inconvenience of diverging, at Schenectady, from the natural line of traffic, and passing four miles further over a local road, and the increased distance of the Fitchburg freight depot from the centre of business in Boston, more than compensate for the difference in length between the Tunnel and the Western routes. However, for present purposes, it is not necessary to split hairs, and the results will show that we can afford to be liberal. We will therefore proceed upon the basis that the Tunnel route will save ten per cent. of the cost of transportation.

Mr. Brooks, in his first report, (pp. 82-85) states his claim for the amount of through freight business for the Tunnel route at its opening at the end of eight years. The basis of his whole estimate is a "statement (on page 82) of the freight business between Albany, Boston and Brighton, from 1843 to 1862, inclusive." Pray, what has he to do with the freight between Boston, Albany and Brighton, in estimating the traffic for the Tunnel route? He might as well have got up a table of freight between Boston, Albany and Springfield. Not a ton of freight between the West and Brighton will pass over the Tunnel route; and no man knows this better than Mr. Brooks. The statement is of the same character as the rest of the Tunnel statistics—thoroughly dishonest, and intended to deceive. Adopting the false data of this table, Mr. Brooks, on page 84, boldly states the following :

"Boston and Albany *through* freight for 1862 was 176,805 tons." He knew that that included all the live stock to Brighton, for he had before him the returns of the Western

Railroad for 1862, which gave the actual through freight as follows—

From Boston to Albany,	22,785 tons.
From Albany to Boston,	113,040 “
<hr/>	
Total,	135,825 tons,

instead of 176,805 tons, as he states it. He included 41,000 tons of Brighton local freight as through freight to Boston. I fully believe, at least I devoutly hope, that no such discreditable deception can be found in any other public document in Massachusetts.

The result is still more deceptive when the receipts for this Brighton freight are included in the item of receipts for through freight; as the freight on live stock is much larger per ton than on any other class of freight.

This error vitiates his whole calculation; for he makes it the basis of his estimate of the traffic of other connecting lines. In correcting his table, I will, however, deduct only the Brighton freight, and his table on page 84 will stand as follows:

Boston and Albany through freight for 1862,	135,825 tons.
Freight of competing lines,	103,258 “
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Total,	239,083 tons.
Add 60 per cent. for increase,	143,450 “
<hr/>	
Total 8 years hence,	382,533 tons.

The Tunnel line he claims one-third of this,	127,511 tons.
And receive for through freight,	\$438,383 00
Which would be, per mile,	2,295 00

In this table, Mr. Brooks figures for 189 miles as the length of his road; I have figured on its true length, 191 miles, as Mr. Brooks elsewhere makes it. Giving to the Tunnel the proportion which belongs to its $43\frac{2}{3}$ miles, and we have \$100,223.00 as the gross earnings for through freight the first year of its working.

We will now examine Mr. Brooks' table of “*Estimated Earnings*,” on page 95 of his first report. For the local

business, this is based on calculations made on pages 65, 66 and 67. As a curiosity, I copy a part of this table.

ESTIMATED EARNINGS.

From local passengers, \$1,382.00 per mile for 44 miles,	\$60,808 00
From local freight, \$2,140 per mile for 44 miles,	94,160 00
From through passengers, \$400.00 per mile for 44 miles,	17,600 00
From through freight, \$2,716.00 per mile for 44 miles,	119,504 00
Mails and express, &c.,	10,000 00
<hr/>	
Total earnings on line,	\$302,072 00
Deduct 55 per cent. for operating expenses,	166,139 00
<hr/>	
Net earned on road,	\$135,933 00

Now, on page 65, Mr. Brooks has a statement made to a committee of the legislature in 1861, giving the entire receipts for a year, for freight and passengers, on the line between Greenfield and North Adams. Everybody knows that these estimates are always put up to the utmost limit of truth. The total receipts are \$41,911.00, and this, too, at prices more than double railroad rates. Fifteen thousand dollars would be a large figure for this traffic on the railroad. And yet Mr. Brooks claims from this local traffic, *the first year the tunnel opens*, \$154,968.00! How does Mr. Brooks figure this? He says, (p. 67,)

“The local business of the Western Railroad, between Springfield and Albany, for the year ending November 30, 1861, was,—

For local passengers,	\$1,589 00 per mile.
For local freight,	2,460 00 “ “

“Estimating that for the Troy and Greenfield at 87 per cent. of this, it will be,—

For local passengers,	\$1,382 00 per mile.
For local freight,	2,140 00 per mile.”

That is, the Tunnel line will have, between Greenfield and Troy, *the first year it is opened*, 87 per cent. of the same amount of business that the Western Railroad has between Springfield and Albany, after having been twenty years developing the resources of its line! The whole argument under the head of "earnings" is thoroughly illogical, jesuitical and insulting to the intelligence of the legislature to which it was addressed. Talk of the undeveloped water-power on this line! Why, there is ten times more unemployed water-power between Westfield and Pittsfield, within twenty rods of the line of a railroad which has been "developing" this power for twenty years, than there is on the entire Tunnel line between Deerfield and North Adams.

Let us return to Mr. Brooks' table of "estimated earnings." We have seen that he claimed for through freight, "\$2,716.00 per mile for 44 miles, \$119,504.00." But deducting Brighton freight, he is entitled, on this basis, to \$2,295.00 per mile s total, \$100,980.00. This amount, deducted from \$119,504.00, gives \$18,524.00 as the amount of Mr. Brooks' over claim for the Brighton freight. Deducting this from Mr. Brooks' gross earnings, \$302,072.00, and we have \$283,548.00 as the gross earnings. Deducting 55 per cent. of this for working expenses, (\$155,951.00,) and we have \$127,597.00 as the net earnings he claims. This is $2\frac{2}{10}$ per cent. on the whole estimated cost of the road, \$5,719,330.00, or $2\frac{9}{10}$ per cent. on \$4,287,883.00, which he estimated it would then cost to finish the road. And this is the best result Mr. Brooks can conjure out of his extravagant estimates of the traffic.

How, then, does Mr. Brooks foot up a remunerating income? He rests in a contract by which the Troy and Boston, the Vermont and Massachusetts, and the Fitchburg Railroad Companies agree to pay to the State of Massachusetts one-fifth of the gross receipts from all their freight and passenger traffic which passes over any part of the Troy and Greenfield Railroad, until the tunnel earns six per cent. net on its final cost! To this humiliation has Mr. Brooks reduced the State of Massachusetts. He must get the tunnel built; he must commit the State to the work; he knew it would not pay; and he applies to the soulless corporations which the State created, to keep

the State out of the folly into which he was determined to plunge her.

Let us see what these corporations have agreed to do. Suppose their gross receipts in a given traffic are \$1,000. Fifty-five per cent. of this goes to working expenses, leaving \$450 as their net earnings. Twenty per cent. of the gross sum, that is, \$200, goes to the State of Massachusetts; leaving \$250 as their net earnings on this traffic. And this contract is made by one road which pays no dividends and has no surplus; which has not added a dollar to its equipment for I don't know how many years; and whose stock is selling at forty cents on the dollar; and they thus fling away nearly one-half of the net profits of their whole through traffic until the tunnel pays six per cent. on its cost, from the profits of its legitimate business; that is, for all time. Is anybody so verdant as to suppose such a contract will be kept? Does anybody think so meanly of Massachusetts as to suppose she would ever attempt to enforce it? Nobody but Mr. Brooks. He, it is understood, chuckles over it as the smartest act of his life.

A rich English railway contractor was asked how he made so much money, while others were ruined. "Oh, I never sign a contract until my lawyer assures me there is a loophole!" There will be loopholes found in this contract bigger than the Hoosac bore.

But admitting that this contract will be fulfilled; what does Mr. Brooks figure up for net income? He claims,—

" Net earnings of his road,	\$135,933 00
Receivable under contract with other roads,	124,336 00

Total net earnings and receipts,	<u>\$260,269 00</u>
--	---------------------

This is $4\frac{55}{100}$ per cent. on the whole estimated capital and interest of \$5,719,330 00

It is $6\frac{7}{100}$ per cent. upon the estimated capital and interest required to complete the road and tunnel, which is \$4,287,833 00."

Remember, nearly half of his net income is to come from this contract; if this fails, where is his income? Again, he puts the cost of completing at \$4,287,833; I think I have

shown that it must cost double that; and it may cost four times that. Where, then, will be his income?

The truth is, the attempt to prove that this concern will ever produce a remunerating income, is thoroughly dishonest. If Mr. Brooks believed it, he would put his own money into it; the blatant advocates of the enterprise would invest theirs in it. They know better. For ten or fifteen years these disinterested gentlemen have exhausted their powers in trying to induce *others* to invest in this thing. Boston capitalists were deluged with statistics; but no subscriptions were forthcoming. Frantic appeals were made to individuals and towns on the line, the result of which was quite a number of subscriptions from men of small means, with but very few, (and those very small,) from the wealthy; the general rule being that, the larger the subscriptions, the smaller the percentage paid in. The rich ones and the knowing ones were shy. Through the press, in the legislature, on the stump, they urged others to "go in." "They bind heavy burdens and grievous to be borne, and lay them on men's shoulders, but they themselves will not move them with one of their fingers."

They inveigled many a hard-earned fifty or hundred dollars out of the farmers; but where are their own thousands? Let us look at some names on the list of subscriptions.

	Number of Shares.	Paid in.
D. N. Carpenter,	30	\$780 00
Otis Clapp, "services,"	2	200 00
Alvah Crocker, "services,"	15	1,500 00
George T. Davis,	20	460 00
W. T. Davis,	20	430 00
H. L. Dawes,	27	135 00
E. H. Derby, "services,"	1	100 00
W. T. Davis,	10	000 00
Whiting Griswold,	5	60 00
John W. Griswold, (Troy,)	1	80 00
Lamson, Goodnow & Co.,	50	2,275 00
" " "	50	000 00
George Millard,	11	1,100 00
H. Smith,	2	190 00
E. R. Tinker,	2	120 00
Daniel S. Richardson,	0!	00 00!
Total,	246	\$7,430 00

Of the sum actually paid in, \$1,800 is put down as paid in "services," leaving \$5,630 paid in cash. I presume that Messrs. Lamson, Goodnow & Co. paid their assessments in land damages, as they settled with Mr. Brooks for \$3,000 in that way; and that Messrs. George T. and W. T. Davis, and D. N. Carpenter, paid theirs also in "services." But letting these stand as cash payments, and we have the pitiful sum of \$5,630 as the contribution of the leaders to this great enterprise. For this list comprises the names of the men who have "run this machine" for the last fifteen years. Look at them. E. H. Derby, president of the Fitchburg Railroad—a road which would derive immense benefit from the completion of the tunnel; who poured out such streams of honeyed eloquence to persuade others into investment,—he risked \$100 in "services." Otis Clapp, the only Boston "capitalist" on the list, who has got up volumes of statistics to prove the profitableness of the investment—he invested \$200 in "services." Alvah Crocker, the Ajax Telamon of the enterprise, who, in addition to his other herculean labors, has neglected his private interests for I don't know how many winters, and labored as a lobby member, and even submitted to the sacrifice of accepting repeatedly a seat in the Senate; with large investments in the Fitchburg Railroad to be doubled in value by the success of this work—he contributed \$1,500 in "services!" Whiting Griswold has devoted the vigorous powers of ingenuous youth to this great work, and has shown his faith in its success by contributing—\$60! in "services"? These last two gentlemen have done more than all others combined, in saddling this load upon the State, and their joint contributions in cash are \$60! John W. Griswold, (I suppose this means John A.; if not, he subscribed nothing!) of Troy—a city which is to surpass its rival, Albany, when this road is opened—at the head of the Iron Company, which received seventy odd thousand dollars from the State treasury in payment for iron sold to Mr. Haupt, and which the State had once paid for—he paid \$80. Surely, it requires more than the exercise of the charity which believeth all things, to give to these gentlemen the slightest credit for sincerity in their noisy professions of faith in the pecuniary results of this enterprise.

But, waiving all considerations of dividends, will the great indirect advantages of the tunnel route, in opening another avenue for Western trade, justify the State in prosecuting the work ?

One important question in considering this matter, is—Will the tunnel route open a new traffic ? Will it tap the West at a different point from existing routes ? If it established a better connection with the Erie Railroad than now exists, or with the traffic which reaches the seaboard by way of Lake Ontario, it would be a great point in its favor. But, confessedly, it does nothing of the kind. It simply goes to Schenectady, and then asks the New York Central road for a share in the traffic which otherwise would come to Albany, and such portion of it as the Western Railroad could accommodate, to Boston. Clearly, then, the tunnel can make no pretensions that it will bring an additional ton of Western freight to Boston, *provided the Western road has capabilities for bringing all that offers.*

In dealing with this matter, we are to consider only the question whether the Western road is capable of bringing *eastward*, from Albany, all the traffic that seeks Boston. Within the last five years, that road has carried 130,000 tons of through freight, and 700,000 tons of local freight westward, and it has brought 532,000 tons of through freight, and 1,700,000 tons of local freight, eastward. These figures show that it can fully accommodate all westward-bound freight. We come then to the pivotal question ?

WHAT ARE THE CAPABILITIES OF THE WESTERN RAILROAD FOR EASTWARD-BOUND FREIGHT ?

I shall not waste time in repelling the charge that I write in the interests of the Western Railroad. I have not spoken to the president of that road since I met him in the Constitutional Convention in 1852 until five months ago, when I met him and was introduced to him in the cars. I never saw the superintendent until within four months, when I had occasion to call at his office to inquire whether I would be sure of fifteen minutes before the Albany train started eastward. I never knew the attorney of the road until he was appointed supreme judge ; and I never had any communication or correspondence

with any of these gentlemen or with any person connected with the road, (except that I applied for and received within ten days some statistics of traffic,) except once or twice to complain of misconduct on the part of their employees. I have never received a dollar, directly or indirectly, from any person connected with the road towards the expenses I have incurred in "fighting the tunnel," or for any purpose whatever, except, (if it be an exception) half a dozen free passes from personal friends. I would not refer to this, were it not for the shameless insinuations freely circulated by men who are incapable of conceiving that any man can perform a public duty from any but mercenary motives.

What are the capabilities of the Western Railroad for traffic eastward from Albany? In 1864 it brought the largest amount of through freight ever brought to Boston in one year, 116,974 tons; in 1865, 87,254 tons.* Now I am not considering what

*The following is among the statistics referred to as having been received from Springfield:

To the inquiry as to the cause for the falling off in the number of tons of through freight in 1865, as compared with that in 1864, no satisfactory answer can be given. In the item of flour, however, the falling off is especially to be seen. Thus:

In 1864, number of bbls. of flour carried to Boston was . . . 590,265 bbls.
In 1865, " " " " " " " " . . . 363,844 "

A falling off of 226,421 bbls.
Or, estimating 10 bbls to a ton, 22,642 tons.

We find upon inquiry, that the New York Central Railroad brought this year to tide water (viz Albany and Troy) over 800,000 bbls of flour less than in 1864. Furthermore,

The Canal brought to tide water in 1864, 1,190,000 bbls.
" " " " 1865, 1,014,600 "

Less in 1865 than 1864, 176,400 bbls.

Add to this,
Falling off on the New York Central, 800,000 bbls.
And there results,
Less in 1865 than 1864, 975,400 bbls.

The following figures which I have taken from the Report of the New York Central Railroad, will show the amount of their freight business this year as compared with that of 1864:

	Tons going West.	Tons going East.	Tons Through.	Tons Way.
1864,	412,986	1,144,162	766,569	790,579
1865,	382,762	892,537	640,575	634,724
Decrease,	30,224	251,625	126,094	155,855

the Western Railroad has done with a ferry at Albany, with forty miles of single track, with its present equipment and *under its present management*; but what it is *capable of doing* with a bridge over the Hudson, with a double track all the way, and under a management fully alive to the duty of making available the highest resources of modern railroad science and of meeting the commercial exigencies of the day.

It is discreditable that our great thoroughfare to the West is still hampered in its resources by forty miles of single track. But surely the State which owns eleven thousand shares of the stock and holds \$4,000,000 in its bonds, and has four directors on its Board, must share the responsibility of this state of things with the directors elected by the stockholders. At any rate, the remedy is in the hands of the State, as she can at any moment take the road out of the hands of the corporation.

A million of dollars will lay another track over the deficient section. Another million expended for freight locomotives and cars will quadruple its capacity for through freight. Two millions thus expended will give the road six or eight times its present capacity. With a double track, and with such an equipment there is hardly a limit to the capabilities of a railroad. Thus, the Pennsylvania Railroad is to-day taking freight trains of two hundred and forty tons each over its road with a grade of 95 feet to the mile for fifteen miles; whereas, the maximum grade on the Western road eastward is $75\frac{1}{2}$ feet to the mile for seven miles. This load of 240 tons is the gross weight of cars and freight, exclusive of engine and tender. Freight cars, well filled as through cars always are, constitute something less than fifty per cent. of the gross weight of the train. This will give something over fifty per cent. as the proportion of paying freight.* Calling the net

*I am indebted to a friend for the following statement:

In 1864 for each ton of merchandise carried one mile the									
Boston & Lowell Railroad carried in weight of freight cars (as estimated per Reports.)									
Boston & Lowell Railroad,	.	.	.	.	.	.	.	1.5	tons.
Boston & Maine Railroad,	.	.	.	.	.	.	.	1.33	"
Boston & Providence Railroad,	1.5	"
Boston & Worcester Railroad,	1.38	"
Western Railroad,	1.398	"

Average,	1.42	tons.
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That is to say, for a gross load, exclusive of engine and tender of 100 tons, but 41.3 tons of paying freight.

When the cars are full, *as to weight*, 100 tons gross load would contain 55.5 tons of paying freight, showing how much the cost of motive power is affected by the nature of the traffic, independently of the profits of the line.

freight as fifty per cent. of the whole load, and we have 120 tons of paying freight to each train. On a double track road, with double the number of passenger trains now run by the Western road, freight trains can be run every twenty minutes and keep out of the way of passenger trains. We will estimate for a freight train each half hour. This will give 240 tons of freight per hour, 5,760 tons per day, and 1,797,120 tons in the year of 312 working days. This is twenty times the amount of freight brought eastward by the Western road last year. Mr. Brooks, (First Report, p. 84,) figures the total freight from the West to Boston eight years hence at 448,101 tons, which his road is going to help the Western road to bring. My calculation proves that the Western road alone can bring 1,797,120 tons—more than four times his estimates of the whole freight eight years hence.

But this calculation assumes that freight engines are used of the same size, or but a trifle larger than those now used on the Western road; whereas, engines are now built, specially adapted to heavy traffic, which will carry nearly double the load above stated. The introduction of them would increase the capacity of the Western road to over three millions of tons eastward annually. Practically, there is hardly a limit to the freighting capabilities of a double track road with adequate equipment.

But cavillers may say, "These are estimates; give us results actually accomplished." They are estimates; but their correctness cannot be disputed. However, here are facts. The New York Central road, with a local traffic probably three times as large as that of the Western Railroad, brought to Albany last year 600,000 tons of through freight. What hinders the Western road, with double track and fully equipped, bringing the same amount of freight to Boston? The Pennsylvania railroad, with ninety-five feet grade, carried 147,973 tons from Philadelphia to Pittsburg, and from Pittsburg to Philadelphia 332,000 tons up lighter grades. These are *facts*; and what this road can do, the Western can do.

But the old bugbear of the high grade on the Western road. Of course, no one denies that the Tunnel line has this advantage; that its maximum grade going east is $52\frac{2}{10}$ feet, while that of the Western is $75\frac{1}{2}$ feet. But this is only a question of

increased cost of freight. With auxiliary power used on the five miles of maximum grade near Pittsfield, this disadvantage would be entirely overcome. With this overcome, the Western line is exactly equal as to grades, (in curves it has the advantage,) to the Tunnel line. What will it cost to put these two roads on a par in this respect?

But first, let us see what Mr. Brooks figures out as the saving on freight by his road over the Western. He claims that the whole through freight from the West to Boston, eight years hence, will be 448,101 tons, say 448,000 tons. The average price per ton received for through freight last year by the Western road was \$4.88. At this rate the gross receipts for 448,000 tons would be \$2,186,240. Mr. Brooks claims that his road can carry freight five per cent. cheaper than the Western. This would amount to \$109,312. Assuming that the Tunnel will cost ten millions, we have a saving of a fraction over one per cent. on the cost of his road. And for this insignificant item Mr. Brooks would commit the State to an expenditure of ten millions of dollars.

But the additional cost of carrying this freight over the Western road will fall far short of this. It reduces itself simply to the cost of auxiliary power to haul the freight up the five miles of maximum grade. Throughout the rest of its entire line the Western road is in every respect equal, and, as to curves, superior to the Tunnel line. What, then, will be the

ANNUAL COST OF AUXILIARY POWER

for these five miles?

I submitted this problem to a friend who is an accomplished engineer, who replied as follows:—

“The problem given by you, if I understand it aright, was to determine the cost of an assistant engine on five miles of 75 feet grade, and the number of tons that could be passed, allowing thirty minutes between trains. The cost of a first class engine, with engineer, fireman, fuel, and repairs, was formerly covered by about \$20 per day. Owing to the large increase in all expenses we will call it \$40. 100 miles per day at an average of 10 miles per hour is a full day's work for a freight engine. If trains run day and night there will be 48 trains in the 24 hours with 30 minutes intervals. One engine can make ten round trips over the

grade ; 48 trips will require five engines on road, and a reserve of two engines in shop,—in all seven. Cost per day of engines $\$5 \times 40 = \200 . An engine weighing thirty tons will haul fourteen cars, weighing seven tons each, with a load of ten tons on a grade of 75 feet to the mile.

“ If on other parts of the line the maximum grade eastward be assumed at 50 feet, an engine can haul on this grade twenty cars, and, aided by the assistant engine on the steep grade, twenty cars to a train, would measure the capacity of the road. 48 trains in 24 hours, 200 tons to a train, 300 days to a year, would give a capacity for eastward freights uniformly distributed, and all the cars fully loaded, of 2,880,000 tons ; but this regularity of movement is unattainable ; it may be calculated, however, that the capacity would not be less than 1,500,000 tons.

“ The cost of the assistant engines would be $\$200 \times 300 = \$60,000$ allowing for interest on cost of reserve engines, extra wear of track, &c., $\$20,000$; total, $\$80,000$ to cover all contingencies. This is equivalent to $5\frac{1}{2}$ cents per ton ; or one cent per ton per mile on the steep grade will cover the cost of assistant power, and add 50 per cent. to the capacity of the road.

“ To get a clear idea of the advantage of this arrangement, suppose that the working division of the road on which the high grade occurs is fifty miles, that, without the assistant engine the load over the whole division would be fourteen cars, with the assistant engine twenty cars. 500,000 tons would then be carried over the fifty miles for very little more than the cost of the extra power on the five miles ; say $\$100,000$ would cover it, which is only four mills per ton per mile as the whole cost of the last 500,000 tons.” [Appendix, D.]

If any proposition can be demonstrated, I think I have demonstrated that there is no inferiority in the Western road, as compared with the Tunnel line, which justified the State in assuming, *or which now justifies it in completing the Tunnel*. I cannot close this topic better than by copying the following extracts from an article by “ Civil Engineer : ”—

“ But it is objected that our present railroad facilities are inadequate to the wants of the community. *Then let them be increased*. You do not help the matter by opening another route, no better than the existing one, and, if finished, equally wanting in facilities. For *it is not roadway that is needed, it is cars and motive power*. And if the Tunnel route were finished to-day, who will furnish these ? Neither the Fitchburg nor the Vermont and Massachusetts roads are any better equipped than the Western, for so immense a traffic as is anticipated, and there is no guarantee, in fact there is not the least probability, that they could or

would increase their equipment, while the State stood between them and the West. So that, after all is done, the State, owning the Tunnel and the Troy and Greenfield road, must invest another million or two for the benefit of these roads. Better do it now for the Boston and Albany; this would be a good investment, for the Western road would gladly pay for the use of the cars at a rate which would quickly reimburse the State both principal and interest. And this result would be reached in one year instead of ten, and at a cost of one million of dollars instead of ten or more.

"In a few weeks the bridge at Albany will be finished, and Boston will have as good a railroad connection with the New York Central Railroad as she can desire. The Baltimore and Ohio Railroad, with its maximum grade of 116 feet to the mile, is the *one* sufficient avenue to Baltimore from the West, and the Pennsylvania railroad, with its maximum grade of 95 feet to the mile, is the *only* direct connection that Philadelphia has with the West, and both are contented; but Boston, with a better road than either, and which has never yet been taxed to one-sixth of its capacity, not satisfied with one, must waste her energies in attempting to construct a second."

TIME OF COMPLETING THE TUNNEL.

Mr. Brooks estimated eight years from his commencement. He has been at work "vigorously" for two years, with the State treasury at his command. What has he done? We give Mr. Brooks' statement of progress made. In his report for 1864, he says,—

"EAST END OF THE TUNNEL.

"The work here has thus far been confined to bringing the bottom of the old cutting down to a regular grade, and such side cutting as was necessary to make room for the drain in the centre of the tunnel. The extreme depth of cutting has been about five and a half feet. This work has been completed as far as the breast of the old cut, work upon which has lately been commenced."

At the West shaft no progress had been made at this time. In his report for 1865, he says,—

"EAST END.

"On the first of December, 1864, the work of cutting down the bottom to bring it to an even grade had been completed to the 12 feet breast of the old cut, and the work of reducing this had just commenced, reaching at that date a point 2,145.9 feet from the portal. On the 15th of March

last, this breast had been removed, and a heading, 15 feet wide and 6 feet high, commenced, 2,399 feet from the portal. The heading on the first of December was 2,904 feet from the portal."

Of the west shaft he says, "the heading is 15 feet wide and 6 feet high," and "has reached a point $414\frac{4}{10}$ feet from the shaft, averaging for the six months ending December 1st, 41 feet per month." Forty feet of this heading was done by Mr. Haupt. From these data we get the actual progress. On March 15th, he commenced at the east end 2,399 feet from the portal. On the first of December he had reached 2,904 feet, showing an advance of 505 feet, averaging $59\frac{7}{7}$ feet per month. These give an aggregate advance of $100\frac{7}{7}$ feet per month. Mr. Haupt advanced at east end 2,399 feet; at west shaft, 40 feet; total, 2,439 feet. Mr. Brooks has advanced at east end 505 feet; at east face of west shaft, 375 feet; and at west face, 265 feet; total, 1,145 feet; say 880 feet. The whole length of the tunnel is 24,586 feet. We have then the following table:—

Total length of Tunnel,	.	.	.	.	24,586 feet.
Done by Mr. Haupt,	.	.	.	.	2,439 feet.
Done by Mr. Brooks,	.	.	.	.	1,145 "
Total to December 1,	.	.	.	————	3,584 feet.
Remaining to be done,	.	.	.	.	21,002 feet.

Remember that the rate of progress for the last six months has been much larger than it has been or can hereafter be for an entire year, for it embraced the best portions of the year for work. But allowing Mr. Brooks the full benefit of this average, that is, 100 feet per month, and it will take him two hundred and twelve months, or seventeen years and eight months to complete the tunnel!

But he is going to do great things after he reaches grade with the central shaft. Let us see. The shaft is to be 1,050 feet deep. On December 1st, he had sunk it 220, at an average of $18\frac{6}{10}$ feet per month, the last six months (the best season of the year and the driest ever known.) He has now 830 feet to go to grade. At an average of $18\frac{6}{10}$ feet per month, this will take him 44 months. At the end of this time he will open two new faces. In these 44 months he will have advanced

4,400 feet at the present working faces. Deducting this amount from 21,002 feet, which was the whole amount to be done last December, and there will remain, at the end of 44 months, 16,602 feet to be bored. We will suppose that he can advance each of his headings at the central shaft 35 feet per month, (and this will be much more difficult at a depth of 1,050 feet than his present advance of 41 feet at the west shaft, which is 325 feet deep.) This gives him 70 feet per month at the central shaft. He will then make the following monthly progress :

At east end, . . . . .	. 59 feet.
west shaft, . . . . .	. 41 “
central shaft, two faces, . . . . .	. 70 “
<hr/>	
Total per month,	170 feet.

At this rate, the 16,602 feet remaining to be done when the central shaft shall be finished, will require 99 months. Adding this to the 44 months during which he will have worked at two faces, and we have a total for completing the tunnel, by work upon all four faces, 133 months, or 11 years from December, 1865 ! And this assumes that every month of that eleven years will give as good progress as the best six months of last year. It allows nothing for “hidden difficulties.” It includes nothing for the 2,300 feet of demoralized rock. During this period, at least, the immense traffic of the West must wait !

But this is not all. The size of the tunnel, when completed as recommended by Mr. Brooks, is to be 22 feet wide at the bottom, 24 feet wide at the widest part, and 21 feet high above the track, giving a sectional area of 433 square feet, or 16 cubic yards per linear foot. Mr. Brooks, in his first report, argues that Mr. Haupt was all wrong in not commencing the tunnel of its full size, and he comes to the conclusion that the suggestion that “a small tunnel be first built and then enlarged,” is “entirely out of the question in this case.” Of course, he intended then to commence and carry through a tunnel of full size. Mr. Doane, in his last report, gives the actual figures of the comparative cost of the work of men on small sections and on larger ones, showing that the larger the section, the smaller, relatively, the cost. And yet, will it be

believed that Mr. Brooks commenced and is carrying on the tunnel with a smaller section than Mr. Haupt's? He is working his heading 6×15 feet, giving an area of 90 square feet, (Mr. Haupt's smallest area was more than double this,) or $3\frac{1}{3}$ cubic yards per linear foot. The whole advance made by Mr. Brooks (besides finishing Mr. Haupt's work,) has been 1,145 feet. At $3\frac{1}{3}$ cubic yards per foot, he has removed 3,817 cubic yards of rock, equal to 239 feet of full sized tunnel. Two years work! Again, when Mr. Brooks commenced, he had 22,147 feet of tunnel to bore. At 16 cubic yards to a foot of completed tunnel, this would require the excavation of 354,352 cubic yards of rock. He has excavated 3,817 cubic yards; this is the one ninety-third part of the whole! or 1.07 per cent.

Again, Mr. Brooks has received from the State, as follows: (not including \$175,000 paid for services and materials, under the Act of 1862:)

Cash from State Treasurer, to December, 1864,	\$450,000 00
Cash from State Treasurer from December, '64	
to December, '65,	505,000 00
Commissioners' salaries, two years,	12,000 00
	<hr/>
Total receipts from the State,	\$967,000 00
Deduct cash on hand Dec. 1, 1865, \$12,491 00	
Deduct value of supplies, &c., on hand	
and not sold to the men,	35,447 00
	<hr/>
	47,938 00
	<hr/>
Expended in work, dam, &c., &c.,	\$919,062 00

He has removed 3,817 cubic yards of rock at the headings, and about 2,000 at the central shaft and, say 1,000 in finishing Mr. Haupt's work; total, 6,817 cubic yards, at a cost of \$135 per cubic yard!; or, including all the above items of excavation, he has removed rock equal to 426 feet of completed tunnel at a cost of \$2,157 per linear foot! The old price for ordinary rock excavations was one dollar per cubic yard; for rock tunnelling, say three dollars; present price, double that, six dollars per cubic yard. Mr. Brooks has made it cost the State \$135 per cubic yard. Mr. Haupt received, for a tunnel with a sectional area of 252 square feet, a little more than half

the size of Mr. Brooks' area, \$30 per linear foot; Mr. Brooks' tunnel cost the State, \$2,157 per linear foot.

But we shall be told that a large portion of Mr. Brooks' expenditures has been for the dam, machinery, &c., and that this will now cease. Who can be sure of that? With the exception of the dam,—and it is hardly credible that Mr. Brooks can repeat that folly; and yet I do not know what guaranty we can have that the man who could commit one such blunder will not commit another equally stupendous:—with this exception, the history of the past affords no assurance that the expenditures hereafter for machinery will not be equally large. I have not referred to his performances at Tunnel Brook, which have been absolutely puerile. He is spending I don't know how many thousands of dollars on pneumatic drills whose success is just as problematical as were the experiments for the last two years from which he predicted the most brilliant results. All his schemes for ventilation have hitherto resulted in furnishing barely enough air for eight or ten men to breathe. How these contrivances will work when he gets four times as far into the mountain as he now is, operating the drills by machines which will require a much larger number of lamps, (two of which consume as much air as one man,) and of workmen, nobody can tell. The engineering science of Europe has failed at Mont Cenis: Will Mr. Brooks' admirers guarantee his success? (Appendix, B.)

I cannot dwell on these topics. This we know: Not the slightest reliance can be placed on Mr. Brooks' estimates. Every step of progress has cost five, ten, twenty times as much as he estimated. What has been will be.

WHAT IS TO BE DONE?

Wiser heads than mine must answer this question. My own judgment leads to but one conclusion: abandon the work, pocket the loss, and let the resources of the State be henceforth applied to legitimate functions. Various suggestions have been made. One is, to let out the work to private parties, who, with additional aid from the State if need be, would complete it. Another is, that the railroad companies to be benefited by the opening of this route should be helped to finish it. Either of them, objectionable as they are, would be

infinitely preferable to going on under the present system. Still another suggestion is,—and I understand gentlemen have been investigating this,—to carry the road over the mountain. I am informed that this examination shows that such a road can be built for a tithe of what the tunnel will cost, with engineering characteristics entirely fitting it for a great commercial road. I throw out these hints for what they are worth. Of this only am I sure: no change can be for the worse.

One duty, it seems to me, is imperative. There should be an investigation which shall settle the question whether it is the policy of the State to go on. The suspension of the work for a year, for this purpose, is of no account, compared with the importance of an investigation of such a character as to command the confidence of the people of the State. There has been no such investigation, and the public opinion of the State is perplexed. The commission should have on it one able man who fully represents the friends of the tunnel, another who fully represents the opponents of the tunnel. Each of these men would enter, *con amore*, into the work of bringing out all the facts and arguments in favor of his side, and of criticizing the views of his opponent. “Impartial” men will not and cannot do this as thoroughly as partisans will. The third man should be the ablest that can be found *in the wide world*, and as “impartial” as human nature will allow.

Another point, I think, is equally settled. The system must be changed, and also the head-manager. First, the system is wrong. The shrewd, intelligent capitalists of the world, after an experience of a generation in building railroads, have come to this conclusion: that the true system, for efficiency and economy, is to place the construction of railroads in the charge of an advisory board, with an executive head, either from their own number or from the outside. This system secures wisdom of counsel and executive efficiency. The State, disregarding these conclusions of business men, has entrusted this gigantic work to one man, and has failed.

My own construction of the Acts of 1862 and 1863 was, that the intention of the legislature was to make the executive council such an advisory board. Unfortunately, disastrously, another interpretation of those Acts prevailed, and Mr. Brooks was left dictator.

Even if the present system is to continue, I think all will agree that the managing head must be changed. At least, if the advisory, organizing, and executive capacities are to be united in one man, he should devote his whole time and capacities to the State. Mr. Brooks can give to this task only the fragments of time and ability, which belong, primarily and entirely to other enterprises. Again, conceding to Mr. Brooks large executive ability, he has shown himself utterly deficient in *organizing* powers. Hence, although reasonably successful in details,—and for this success he is largely indebted to the resident engineer and his assistants,—Mr. Brooks has lamentably failed in planning and organizing the enterprise. He is not an educated engineer; he has had no practical experience in works of this kind; and, to sum it all up in one word, nature did not endow him with *the organizing capacity*. The disadvantages attending the prosecution of works of this kind by the State are large enough, even when they are prosecuted in accordance with the long-settled rules of individual action. If these are still to be set at naught, the future can bring forth only a repetition and aggravation of past failures.

In this discussion I have omitted entirely one most important topic—the mischievous influence of public works upon the political morality of a State. I cannot here enter this field, inviting as it is. May a Merciful Heaven save old Massachusetts from the demoralizing influences which have so debauched the politics of Pennsylvania and New York! (Appendix, C.)

My appeal is founded on material considerations. I trust it will not be deemed improper for me to implore the legislature to sound this wretched business to the bottom. There is a large class of men living on the tunnel line, who go first, last and always for any management, wise or foolish, which looks to the completion of the work. They stood by Mr. Haupt, until they saw a shorter cut to their end, when they remorselessly deserted him. They stand by Mr. Brooks in mismanagement infinitely more disastrous, and they will desert him too, when they find he can no longer serve them. Well knowing the abuses that now prevail, they close their eyes and forbear to look, and they will resolutely discountenance investigation. They reason that every additional dollar spent in connection with the enterprise, increases the guarantee that it will be completed. The interests

of the State do not come within their range of vision. But the responsible guardians of the interests and good name of the State act from higher motives. They are relied upon to inquire diligently whether "these things be so." Of one thing they may, I think, be certain, that if the wisdom and courage of the general court shall prove unequal to the occasion, and the tunnel is left to go on under Mr. Brooks at an expense so many times greater than the cost of the same work under his predecessor, the prayer will soon come up from an abused people,

Oh, for one year of Herman Haupt!

APPENDIX.

[A.]

I had intended to have made a record of the *ex parte* proceedings of the executive council of 1861; but I have mislaid the documents, which it cost a good deal of pains to hunt up. Perhaps it is as well. The pillory in which it would have placed those seven gentlemen, (Hon. Jacob Sleeper did not join them,) would have been anything but comfortable. It was a disorganizing and discreditable conspiracy to usurp the prerogatives of the governor and dictate his official duties. The day will come, if it has not already come, when most of those gentlemen will desire that the whole record might be expunged.

[B.]

The following from the London "Mining Journal," shows that blunders are committed abroad as well as here, and suggests the possibility of the failure of Mr. Brooks' contrivances for ventilation:—

"In a communication from Pico Mulera, Italy, dated January 4, Mr. H. Hoskings, whose name is well known to the readers of the London Mining Journal, writes,—'The mortality amongst the workmen employed in the Mount Cenis Tunnel is so great, in consequence of powder smoke and bad ventilation, that they have refused to work any more. The work is now at a standstill;' and the statement is especially interesting, from the precise manner in which it confirms the opinion expressed in the Mining Journal of January 2, 1864, by our esteemed correspondent, Mr. Nicholas Ennor, in the account of his visit to the tunnel. He then stated,—'I next turn to the air department. The moment I came to the tunnel I looked to its mouth; to my surprise I could not discover the least sign of smoke or gas emerging from it, which instantly convinced me that something was wrong. I had not entered the tunnel two hundred yards before I met a still, dense smoke; it soon become so dense that I could not see a lamp on the opposite

side, which, of course, was only twenty-six feet distant. The horses and wagons passed, but I could not see them. This continued up to within one hundred yards of the end, when a light could be seen for twenty yards. Here air was liberated sufficient to support the men with the machine; but as it passed back, where the side men were at work, it was all devoured by the men and lamps.

"I was in about an hour, and when I came out I spit as black as though I had dined on lampblack; so did the gentleman that accompanied me. I think I have had over fifty-five years' actual mine practice, and I have come to the conclusion that this work will never be accomplished without other means than the present be adopted. I am satisfied that there is nothing deserving or eulogizing to the French or Italian engineering for what is doing to carry out this undertaking, notwithstanding that they have an abundance of water-power at command, and machinery that, I should judge from a momentary glance, cost £40,000."

Mr. Brooks beats them "all hollow." His machinery has already cost \$500,000, not including the drills now being made at Fitchburg, air-compressors, &c., &c.

[C.]

It would be instructive to show how mischievously the tunnel has interfered in the politics of the State, especially as illustrated in its control of state, senatorial and councillor conventions, legislative caucusses, &c. But these topics open too wide a field. One instance must suffice.

My own attention was first directed to the disturbing agency of this selfish and malignant element by the election of 1861. In the summer of that year, the controversy arose between Governor Andrew and Mr. Haupt, which resulted in the suspension of the work. The following tables of the votes of the tunnel towns proper in 1860 and 1861, will show perfectly that the people of that region considered the tunnel question paramount to all political issues. It will be seen that these towns, which in 1860 gave a vote of nearly five to one for Andrew over Beach, in 1861 gave an actual majority to Mr. Davis. So debauched had this section become, that if the State had followed their lead, the State administration would have been delivered over to the enemy, and the glorious war record of old Massachusetts would have been lost forever.

I give the votes also for lieutenant-governor in 1861, to show that the hostility was to Governor Andrew.

	GOVERNOR, 1860.		GOVERNOR AND LIEUT. GOV., 1861.			
	Andrew.	Beach.	Andrew.	Davis.	Nesmith.	Bailey.
FRANKLIN COUNTY.						
Buckland,	178	68	10	138	133	28
Charlemont,	157	1	21	3	84	1
Colrain,	214	61	86	89	97	91
Deerfield,	335	120	140	111	156	111
Erving,	63	19	36	20	47	11
Greenfield,	321	114	196	144	266	106
Hawley,	118	3	—	64	81	—
Heath,	87	—	37	18	64	10
Leyden,	75	15	41	18	41	18
Monroe,	30	3	17	18	38	2
Montague,	206	28	125	17	150	17
Orange,	202	79	129	89	133	87
Rowe,	75	3	4	23	58	—
Shelburne,	256	31	39	111	134	25
Wendell,	77	26	64	38	67	35
BERKSHIRE COUNTY.						
Clarksburg,	57	13	3	18	8	16
Florida,	70	9	3	55	58	8
Savoy,	91	41	54	37	48	37
Totals,	2,612	634	1,005	1,011	1,663	605

[D.]

Mr. Brooks estimates the total amount of through freight from the West, to Boston, eight years hence, at 448,000 tons. The calculation on pages 56 and 57 shows that 1,500,000 tons can be carried annually, at a cost, for auxiliary power, up the high grade, of \$100,000. For a materially smaller amount, the cost would decrease in the same proportion. I am informed, by my friend who made the calculation in the text, that 500,000 tons could be carried annually, at a cost, for auxiliary power, up this high grade, of \$50,000. This sum, then, is the entire saving which the tunnel would make, if completed eight years hence, even if the entire freight from the West passed over that line. Fifty thousand dollars, then, annually, which is the interest of \$1,000,000 at five per cent., is the sum total of the exigency for the tunnel, for through freight. But Mr. Brooks claims only one-third of this freight for his line, so that the saving is reduced to one-third of \$50,000, or

\$16,667 annually, and this, from Mr. Brooks' own figures, is absolutely the whole exigency, so far as the great grievance of the incapacity of the Western Railroad is concerned, for the expenditure by the State of ten millions of dollars, for another great commercial avenue to the West.

ADDENDUM.

THE DEERFIELD DAM.

To illustrate the extravagant outlay for this dam, I have taken some pains to ascertain the cost of the Holyoke dam. This dam crosses the Connecticut River; is 1,017 feet long, 30 feet high, and cost about \$115,000. I have been unable to get the exact figures, but I am informed on the best authority, that the cost was within that sum. It has stood over sixteen years, and has at times delivered a volume of water twelve and a half feet deep over its entire length. Mr. Brooks' dam is 250 feet long, 20 feet high, and the largest volume of water ever delivered over it has been thirty-three inches. The cost, when completed, including canal, will be \$275,000. The volume of water delivered over the Holyoke dam is nineteen times greater than the largest ever delivered over the Deerfield dam.

If a dam was to be built at all at the tunnel, it should have been built lower down, at the point where the power is to be applied,—thus saving the great cost of rock excavation for canal, waste-way, &c. A dam could have been built there, upon the same plan as the Holyoke, which would have been perfectly safe for twenty years, at an outside cost of \$25,000.



